

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re:	Fenderson <i>et al.</i>	Confirmation No.:	4135
U.S. Patent No.	5,990,046	Patent Date:	November 23, 1999
Appl. No.:	08/911,926	Filed:	August 15, 1997
For:	Synergistic Herbicidal Compositions of Dimethenamid		

Mail Stop Reconstruction  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO NOTICE UNDER 37 CFR § 1.251**

1. In response to the Notice Under 37 CFR §1.251 (copy attached), that was mailed from the United States Patent and Trademark Office (“USPTO”) on November 21, 2007, the patentee encloses herewith the following documents for reconstruction of the lost file:

- A. A copy the specification;
- B. Declaration and Power of Attorney for United States Patent Application;
- C. Divisional Application Transmittal; Information Disclosure Statement and; Preliminary Amendment dated August 15, 1997;
- D. Filing Receipt;
- E. Continued Prosecution Application (CPA) Request Transmittal; Preliminary Amendment; and Petition and Fee for Extension of Time dated February 3, 1999;
- F. Non-final Office Action mailed March 19, 1999;
- G. Petition and Fee for Extension of Time and Amendment dated July 19, 1999;
- H. Notice of Allowance and Issue Fee Due mailed August 2, 1999;
- I. Part B- Issue Fee Transmittal dated October 8, 1999;
- J. Issue Notification; and
- K. Certificate of Correction

2. Patentee is aware of two pieces of correspondence listed in the transactional history for the above-referenced patent that are not in patentee’s possession, which are:

- A. Non-final Rejection dated August 3, 1998; and
- B. Express Abandonment (during examination) mailed February 3, 1999

3. Patentee affirms that the attached documents reflect a complete and accurate copy of patentee’s record of correspondence between the Office and the patentee for the above-identified patent (except for U.S. patent documents).

4. As stated above, patentee is aware of certain correspondence documents that are not among patentee's records.

5. It is not believed that any fees are required, however, in the event that any fees are necessary to allow consideration of these documents, such fees are hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

/christopher m. humphrey/

Christopher M. Humphrey  
Registration No. 43,683

**CUSTOMER NO. 00826**  
**ALSTON & BIRD LLP**  
Bank of America Plaza  
101 South Tryon Street, Suite 4000  
Charlotte, NC 28280-4000  
Tel Charlotte Office (704) 444-1000  
Fax Charlotte Office (704) 444-1111

ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON MAY 21, 2008.

**DECLARATION AND POWER OF ATTORNEY FOR  
UNITED STATES PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name, and

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if more than one name is listed below) of the subject matter which is claimed and for which a United States patent is sought on the invention entitled

**HERBICIDAL COMPOSITIONS**

the specification of which

  / is attached hereto.

/X/ was filed on June 23, 1994 as application Serial No. 08/265,594.

/   was filed as Patent Cooperation Treaty international application No. \_\_\_\_\_, 19\_\_\_\_, if this box contains an X /  /, was amended on under Patent Cooperation Treaty Article 19 on \_\_\_\_\_, 19\_\_\_\_, and if this box contains an X /  /, was amended on \_\_\_\_\_

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge my duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim the benefit under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate indicated below and of any Patent Cooperation Treaty international applications(s) designating at least one country other than the United States indicated below and have also identified below any foreign application(s) for patent or inventor's certificate and Patent Cooperation Treaty international application(s) designating at least one country other than the United States for the same subject matter and having a filing date before that of the application for said subject matter the priority of which is claimed:

<u>Country</u>	<u>Number</u>	<u>Filing Date</u>	<u>Priority Claimed</u>	
<u>Great Britain</u>	<u>9313210.8</u>	<u>June 25, 1993</u>	<u>/ / Yes</u>	<u>/ / No</u>
			<u>/ / Yes</u>	<u>/ / No</u>

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and of any Patent Cooperation Treaty international application(s) designating the United States listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in said prior application(s) in the manner required by the first paragraph of Title 35, United States Code §112, I acknowledge my duty to disclose material information as defined in Title 37 Code of Federal Regulations, §1.56(a) which occurred between the filing date(s) of the prior application(s) and the national or Patent Cooperation Treaty international filing date of this application:

<u>Application Serial No.</u>	<u>Filed</u>	<u>Status (Pending, Abandoned, Patented)</u>
<u>08/236,732</u>	<u>May 2, 1994</u>	<u>PENDING</u>
<u>08/153,946</u>	<u>November 16, 1993</u>	<u>PENDING</u>
<u>08/019,386</u>	<u>February 18, 1993</u>	<u>ABANDONED</u>
<u>08/152,066</u>	<u>November 12, 1993</u>	<u>PENDING</u>
<u>08/019,933</u>	<u>February 19, 1993</u>	<u>ABANDONED</u>

I hereby appoint the following:

ROBERT S. HONOR  
 RICHARD E. VILA  
 WALTER F. JEWELL  
 THOMAS O. MCGOVERN  
 MELVYN M. KASSENOFF  
 JOSEPH J. BOROVIAN  
 DIANE E. FURMAN  
 CARL W. BATTLE  
 ANDREW N. PARFOMAK  
 JOHN L. CHIATALAS  
 CAROL A. LOESCHORN  
 ALLEN E. NORRIS  
 LYNN MARCUS-WYNER

Reg. No. 22,801  
 Reg. No. 20,728  
 Reg. No. 24,414  
 Reg. No. 25,741  
 Reg. No. 26,389  
 Reg. No. 26,631  
 Reg. No. 31,104  
 Reg. No. 30,731  
 Reg. No. 32,431  
 Reg. No. 31,818  
 Reg. No. 35,590  
 Reg. No. 34,490  
 Reg. No. 34,869

respectively and individually, as my attorneys and/or agents, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. Please address all communications to Allen E. Norris, SANDOZ AGRO, INC., Patent Department, 975 California Avenue, Palo Alto, California 94304-1104, the telephone number of whom is 415/354-3592.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

**\*IMPORTANT:** Before this declaration is signed, the patent application (the specification, the claims and this declaration) must be read and understood by each person signing it, and no changes may be made in the application after this declaration has been signed.

Sole inventor or  
first joint inventor:

Full name: John M. Fenderson

Signature:

John M. Fenderson

Date:

7/14/94

Citizenship:

U.S.A.

Residence:

902 Hardtner Street

Box 47

Kiowa, Kansas 67070

U.S.A.

P.O. Address:

Same

Second joint inventor:

Full name:

William B. O'Neal

Signature:

William B. O'Neal

Date:

7/22/94

Citizenship:

U.S.A.

Residence:

432 Town Place Circle


Buffalo Grove, Illinois 60089

U.S.A.

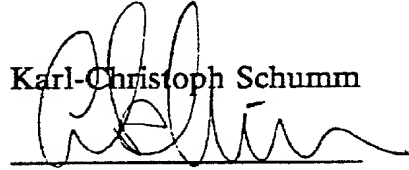
P.O. Address:

Same

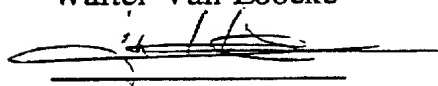
**Third joint inventor:**

Full name: Théo Quaghebeur  
Signature:   
Date: 7/29/94  
Citizenship: Belgium  
Residence: Rue des Résistants 54  
B-7030 Saint-Symphorien  
Belgium  
P.O. Address: Same

**Fourth joint inventor:**

Full name: Karl-Christoph Schumm  
Signature:   
Date: 8-19-94  
Citizenship: Germany  
Residence: Rua Paraguacu, 74  
13.044-230 Campinas - SP  
Brazil  
P.O. Address: Same

**Fifth joint inventor:**

Full name: Walter Van Loocke  
Signature:   
Date: 8/2/94  
Citizenship: Belgium  
Residence: Heerweg 10  
B-8377 Meetkerke  
Belgium  
P.O. Address: Same

DIVISIONAL APPLICATION TRANSMITTAL  
UNDER 37 C.F.R. § 1.60

## Prior Application

Examiner: S. Clardy  
Art Unit: 1209

## Box Patent Application

Assistant Commissioner for Patents  
Washington, DC 20231

Sir:

This is a request for filing a divisional application under 37 C.F.R. § 1.60, of pending prior application Serial No. 08/467,364, filed on June 6, 1995, entitled **HERBICIDAL COMPOSITIONS** by the following named inventors: John M. Fenderson, William B. O'Neal, Theo Quaghebeur, Karl-Christoph Schumm, Walter Van Looche.

Enclosed is a copy of the latest inventor signed prior application, including the Oath and Declaration as originally filed. I hereby verify that the attached papers are a true copy of the latest inventor signed prior application Serial No. 08/467,364 as originally filed on June 6, 1995, and further that all statements made herein of my own knowledge are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

The filing fee is calculated below:

(Col. 1)		(Col. 2)		Other Than	
<u>No. Filed</u>		<u>No. Extra</u>		Small Entity	Small Entity
				Rate	Fee
BASIC FEE				\$ 385	\$ 770
TOTAL CLAIMS:	10-20 = 0	x 11 =	\$	x 22 =	\$
INDEP CLAIMS:	2-3 = 0	x 40 =	\$	x 80 =	\$
[ ] MULTIPLE DEPENDENT CLAIMS PRESENTED		+130 =	\$	+260 =	\$
*If the difference in Column 1 is less than zero, enter "0" in Column 2		TOTAL	\$	TOTAL	\$ 770

- [X] The Commissioner is hereby authorized to charge any fees which may be required or credit any overpayment to Deposit Account No. 16-0605.
- [X] A check in the amount of \$770.00 to cover the filing fee is enclosed.
- [X] Cancel in this application original Claims 1-16 of the prior application before calculating the filing fee.

In re: Fenderson et al.  
Filed: Concurrently herewith  
Attorney Docket No. 8867-8C  
Page 2

- [X] Amend the specification by inserting before the first line the sentence:  
-- This application is a division of application Serial No. 08/467,364, filed June 6, 1995, which is a continuation-in-part of application Serial No. 08/153,946, filed November 16, 1993 which is a continuation of application Serial No. 08/019,386, filed February 18, 1993; a continuation-in-part of application Serial No. 08/152,066, filed November 12, 1993 which is a continuation of application Serial No. 08/019,933, filed February 19, 1993; and a continuation of application Serial No. 08/236,732, filed May 2, 1994.--
- [ ] The prior application is assigned of record to \_\_\_\_\_.
- [X] A Preliminary Amendment is enclosed.
- [X] Also enclosed is an Information Disclosure Statement.

The Power of Attorney which appears in the original papers in the prior application is to:

Robert S. Honor	Reg. No. 22,801
Richard E. Vila	Reg. No. 20,728
Walter F. Jewell	Reg. No. 24,414
Thomas O. McGovern	Reg. No. 25,741
Melvyn M. Kassenoff	Reg. No. 26,389
Joseph J. Borovian	Reg. No. 26,631
Diane E. Furman	Reg. No. 31,104
Carl W. Battle	Reg. No. 30,731
Andrew N. Parfomak	Reg. No. 32,431
John L. Chiatalas	Reg. No. 31,818
Carol A. Loeschorn	Reg. No. 35,590
Allen E. Norris	Reg. No. 34,490
Lynn Marcus-Wyner	Reg. No. 34,869

Address all future communications to:

Address all future communications to: Stephen M. Bodenheimer, Jr.  
THE BELL SELTZER INTELLECTUAL PROPERTY GROUP  
ALSTON & BIRD LLP  
Post Office Drawer 34009  
Charlotte, NC 28234  
Tel (704) 331-6000  
Fax (704) 334-2014

Respectfully submitted,



Andrew T. Meunier  
Registration No. 40,726  
August 15, 1997

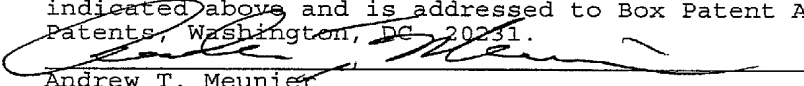


In re: Fenderson et al.  
Filed: Concurrently herewith  
Attorney Docket No. 8867-8C  
Page 3

"Express Mail" mailing label number EM07435553US

Date of Deposit: August 15, 1997

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Assistant Commissioner for Patents, Washington, DC 20231.

  
Andrew T. Meunier  
201480

Attorney's Docket No. 8867-8C

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Fenderson et al.  
Serial No.: Applied For  
Filed: Concurrently Herewith  
For: **HERBICIDAL COMPOSITIONS**

August 15, 1997

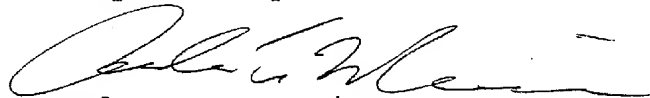
Assistant Commissioner for Patents  
Washington, DC 20231

**INFORMATION DISCLOSURE STATEMENT**  
**CITATION UNDER 37 C.F.R. § 1.97**

Sir:

Attached is a list of documents on form PTO-1449 together with a copy of each identified document. It is requested that these documents be considered by the Examiner and officially made of record in accordance with the provisions of 37 C.F.R. § 1.97 and Section 609 of the MPEP.

Respectfully submitted,



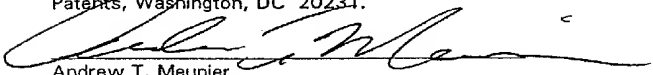
Andrew T. Meunier  
Registration No. 40,726

THE BELL SELTZER INTELLECTUAL PROPERTY GROUP  
ALSTON & BIRD LLP  
Post Office Drawer 34009  
Charlotte, NC 28234  
Tel (704) 331-6000  
Fax (704) 334-2014

CERTIFICATE OF MAILING

"Express Mail" mailing label number EM07435553US  
Date of Deposit: August 15, 1997

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Assistant Commissioner of Patents, Washington, DC 20231.



Andrew T. Meunier  
285715

<b>FORM PTO-1449</b> U.S. Department of Commerce Patent and Trademark Office				Attorney Docket Number: 8867-8C		Serial No. Applied For	
LIST OF DOCUMENTS CITED BY APPLICANT  (Use several sheets if necessary)				Applicant: Fenderson et al.			
				Filing Date: Concurrently Herewith		Group 1209	
U. S. PATENT DOCUMENTS							
Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	1	5,089,046	02/18/92	Lee et al.			
	2	5,006,150	04/09/91	Lee et al.			
	3	4,921,526	05/01/90	Lee et al.			
	4	4,869,748	09/16/89	Knudsen			
	5	4,789,393	12/06/88	Hanagan			
	6	4,695,673	09/22/87	Heather et al.			
	7	4,666,502	05/19/87	Seckinger et al.			
	8	3,013,054	12/12/61	Richter			
FOREIGN PATENT DOCUMENTS							
		Document Number	Date	Country	Class	Subclass	Translation Yes   No
	9	EP 137,963	04/24/85	EPO			
	10	EP 186,118	07/02/86	EPO			
	11	EP 186,119	07/02/86	EPO			
	12	EP 186,120	07/02/86	EPO			
	13	EP 230 596	08/05/87	EPO			
	14	EP 249,150	12/16/87	EPO			
	15	EP 315,889	05/17/89	EPO			
	16	EP 336,898	10/11/89	EPO			
	17	EP 338,992	10/25/89	EPO			
	18	EP 380 447	01/08/90	EPO			
	19	EP 394,889	10/31/90	EPO			
	20	EP 461,079	12/11/91	EPO			
	21	EP 549,524	06/30/93	EPO			
	22	WO 92/07837	05/14/92	PCT			
	23	WO 91/10653	07/25/91	PCT			

EXAMINER \_\_\_\_\_

DATE CONSIDERED \_\_\_\_\_

\*EXAMINER \_\_\_\_\_

Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<b>FORM PTO-1449</b> U.S. Department of Commerce Patent and Trademark Office  LIST OF DOCUMENTS CITED BY APPLICANT  (Use several sheets if necessary)		Attorney Docket Number: 8867-8C	Serial No. Applied For
		Applicant: Fenderson et al.	
		Filing Date: Concurrently Herewith	Group 1209
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
	24	<i>Weed Control And Soil Persistence Studies With Dimethenamid In Maize</i> , A. Rahman and T.K. James; Proc. 45th N.Z. Plant Protection Conf. 1992: 84-88	
	25	<i>Herbicidal Composition</i> , Kimura et al.; United States Statutory Invention Registration, Reg. No. H670, 9/5/89	
	26	<i>SAN 582 H - A New Herbicide For Weed Control In Corn And Soybeans</i> , J. Harr, K. Seckinger, E. Ummel, Brighton Crop Protection Conference - Weeds, 1991, pp. 87-92	
	27	<i>Weed Control in No-tillage and Conventional Corn (Zea mays) with ICIA-0051 and SC-0774</i> , John S. Wilson and Chester L. Foy; <i>Weed Technology</i> , 1990, Vol. 4:731-738	

285653

EXAMINER  
\*EXAMINER

DATE CONSIDERED

Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Attorney's Docket No. 8867-8C

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Fenderson et al.  
Serial No.: Applied For  
Filed: Concurrently Herewith  
For: **HERICIDAL COMPOSITIONS**

August 15, 1997

Assistant Commissioner for Patents  
Washington, DC 20231

PRELIMINARY AMENDMENT

Dear Sirs:

Please amend the above-identified application as follows:

IN THE SPECIFICATION:

Please amend the title to read --Synergistic  
Herbicidal Compositions of Dimethenamid--.

IN THE CLAIMS:

Please delete Claims 1-16 and add the following:

17. A method of controlling undesired plant growth in the presence of a crop comprising applying to the locus of said undesired plant growth a herbicidally effective aggregate amount of dimethenamid and a triketone or dione herbicide wherein the application rate of dimethenamid is from 0.1 to 3.0 kg/ha and the application rate of the triketone or dione is from 0.05 to 2.0 kg/ha.

18. A method according to claim 17 wherein the triketone or dione is selected from the group consisting of 2-(2-chloro-4-methanesulfonylbenzoyl)-1,3-cyclohexanedione; 2-(4-methylsulfonyloxy-2-nitrobenzoyl)-4,4,6,6-tetramethyl-1,3-cyclohexane; 3-(4-methylsulfonyloxy-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 3-(4-methylsulfonyl-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(4-chloro-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-

In re: Fenderson et al.  
Serial No.: Applied For  
Filed: Concurrently Herewith  
Attorney Dkt. No. 8867-C  
Page 2

3,5(4H,6H)dione; 4-(4-methylthio-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)-dione; 3-(4-methylthio-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(2-nitro-4-trifluoromethoxybenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5-(4H,6H)-dione.

19. A method according to claim 17 wherein the triketone or dione is 4-(4-chloro-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)dione.

20. A method according to claim 17 further comprising a triazine herbicide.

21. A method according to claim 17 wherein the crop is maize.

22. A method according to claim 17 wherein the crop is sugar cane.

23. A method according to claim 17 wherein the application rate of dimethenamid is from 0.25 to 1.5 kg/ha and the application rate of the triketone or dione herbicide is from 0.1 to 0.6 kg/ha.

24. A method according to claim 17 wherein the dimethenamid and the triketone or dione herbicide are applied postemergence.

25. A herbicidal composition comprising a herbicidally effective aggregate amount of a triketone or dione herbicide and dimethenamid in a weight ratio between 1:2 and 1:10.

In re: Fenderson et al.  
Serial No.: Applied For  
Filed: Concurrently Herewith  
Attorney Dkt. No. 8867-C  
Page 3

26. A composition according to claim 25 further comprising a triazine at a weight ratio of 3:1 to 1:3 relative to the dimethenamid content.

REMARKS

Applicants have cancelled Claims 1-16 and added new claims 17-26. The above claim amendments are made for clarification thus placing the claims in better form for examination on the merits.

Respectfully submitted,



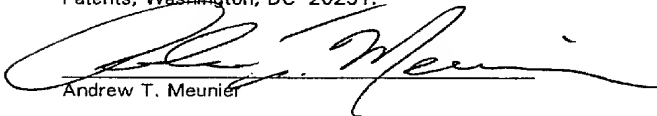
Andrew T. Meunier  
Registration No. P-40,726

BELL, SELTZER, PARK & GIBSON, P.A.  
P.O. Drawer 34009  
Charlotte, NC 28234  
Telephone (704) 331-6000  
Facsimile (704) 334-2014

**CERTIFICATE OF EXPRESS MAILING**

"Express Mail" mailing label number EM07435553US  
Date of Deposit: August 15, 1997

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box ^C, Assistant Commissioner of Patents, Washington, DC 20231.

  
Andrew T. Meunier

FILING RECEIPT



UNITED STATES DEPARTMENT OF COMMERCE  
Patent and Trademark Office  
ASSISTANT SECRETARY AND COMMISSIONER  
OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTORNEY DOCKET NO.	DRWGS	TOT CL	IND CL
08/911,926	08/15/97	1209	\$770.00	8867-8C	0	10	2

STEPHEN M BODEIMER JR  
THE BELL SELTZER INTELLECTUAL PROPERTY  
ALSTON & BIRD  
PORT OFFICE DRAWER 34009  
CHARLOTTE NC 28234

Receipt is acknowledged of this nonprovisional Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Application Processing Division's Customer Correction Branch within 10 days of receipt. Please provide a copy of the Filing Receipt with the changes noted thereon.

Applicant(s)

JOHN M. FENDERSON, KIOWA, KS; WILLIAM B. O'NEAL,  
BUFFALO GROVE, IL; THEO QUAGHEBEUR, SAINT-SYMPHORIEN,  
BELGIUM; KARL-CHRISTOPH SCHUMM, CAMPINAS, BRAZIL;  
WALTER VAN LOOCKE, MEETKERKE, BELGIUM.

CONTINUING DATA AS CLAIMED BY APPLICANT-

THIS APPLN IS A DIV OF	08/467,364	06/06/95	PAT 5,716,901
WHICH IS A CIP OF	08/153,946	11/16/93	ABN
WHICH IS A CON OF	08/019,386	02/18/93	
WHICH IS A CIP OF	08/152,066	11/12/93	ABN
WHICH IS A CON OF	08/019,933	02/19/93	
WHICH IS A CIP OF	08/236,732	05/02/94	

FOREIGN/PCT APPLICATIONS-ENGLAND

9313210.8

06/25/9

FOREIGN FILING LICENSE GRANTED 01/06/98

TITLE

HERBICIDAL COMPOSITIONS

PRELIMINARY CLASS: 504



**CONTINUED PROSECUTION APPLICATION (CPA)  
REQUEST TRANSMITTAL**

(Form is only for Continuation or Divisional applications under 37 CFR 1.53(d))

Address to:  <b>ASSISTANT COMMISSIONER FOR PATENTS BOX CPA WASHINGTON, DC 20231</b>	Attorney Docket No. 8867-8C Of Prior Application  <hr/> First Named Inventor: Fenderson et al. <hr/> Examiner Name: S. Clardy <hr/> Group/Art Unit: 1616 <hr/> Express Mail Label No. EL245786168US
---	---

This is a request for a ☒ continuation or ☐ divisional application under 37 CFR 1.53(d) (continued prosecution application (CPA)) of prior application number 08/911,926 filed on August 15, 1997 entitled **HERBICIDAL COMPOSITIONS**.

NOTES

**FILING QUALIFICATIONS:** The prior application identified above must be a nonprovisional application that is either: (1) complete as defined by 37 CFR § 1.51(b), or (2) the national stage of an international application in compliance with 35 U.S.C. 371. A Notice will be placed on a patent issuing from a CPA, except for reissues and designs, to the effect that the patent issued on a CPA and is subject to the twenty-year patent term provisions of 35 U.S.C. § 154(a)(2). Therefore, the prior application of a CPA may have been filed before, on or after June 8, 1995.

**C-I-P NOT PERMITTED:** A continuation-in-part application cannot be filed as a CPA under 37 CFR § 1.53(d), but must be filed under 37 CFR § 1.53(b).

**EXPRESS ABANDONMENT OF PRIOR APPLICATION:** The filing of this CPA is a request to expressly abandon the prior application as of the filing date of the request for a CPA. 37 CFR § 1.53(b) must be used to file a continuation, divisional, or continuation-in-part of an application that is not to be abandoned.

**ACCESS TO PRIOR APPLICATION:** The filing of this CPA will be construed to include a waiver of confidentiality by the applicant under 35 U.S.C. 122 to the extent that any member of the public who is entitled under the provisions of 37 CFR § 1.14 to access to, copies of, or information concerning, the prior application may be given similar access to, copies of, or similar information concerning, the other application or applications in the file jacket.

**35 U.S.C. 120 STATEMENT:** In a CPA, no reference to the prior application is needed in the first sentence of the specification and none should be submitted. If a sentence referencing the prior application is submitted, it will not be entered. A request for a CPA is the specific reference required by 35 U.S.C. 120 and to every application assigned the application number identified in such request, 37 CFR § 1.78(a).

1. ☐ Enter the unentered amendment previously filed on \_\_\_\_\_ under 37 CFR § 1.116 in the prior nonprovisional application.
2. ☒ A preliminary amendment is enclosed.
3. This application is filed by fewer than all the inventors named in the prior application, 37 CFR 1.53(d)(4).
  - a. ☐ **DELETE** the following inventor(s) named in the prior nonprovisional application: \_\_\_\_\_
  - b. ☐ The inventor(s) to be deleted are set forth on a separate sheet attached hereto.
4. ☐ A new power of attorney is enclosed.

5. Information Disclosure Statement (IDS) is enclosed:

- a. ☐ PTO-1449  
b. ☐ Copies of IDS Citations

CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	TOTAL CLAIMS (37 CFR 1.16(c))	10 - 20* =	0	x \$ 18 =	\$
	INDEPENDENT CLAIMS (37 CFR 1.16(b))	2 - 3** =	0	x \$78 =	
	MULTIPLE DEPENDENT CLAIMS (if applicable)(37 CFR 1.16(d))			+ \$260 =	
	BASIC FEE (37 C.F.R. 1.16)				760.00
	Total of above Calculations =				\$
	Reduction by 50% for filing by small entity (Note 37 CFR 1.9, 1.27, 1.28).				
	* Reissue claims in excess of 20 and over original patent. **Reissue independent claims over original patent.				
	TOTAL =				\$ 760.00

6. Small entity status:

- a. ☐ A small entity statement is enclosed.  
b. ☐ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.  
c. ☐ is no longer claimed.

7. The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. 16-0605.

- a. ☒ Fees required under 37 CFR 1.16 (National filing fees).  
b. ☒ Fees required under 37 CFR 1.17 (National application processing fees).

8. ☒ A check in the amount of \$760.00 is enclosed.

9. ☐ New Attorney Docket Number, if desired \_\_\_\_\_

10. ☐ Other: \_\_\_\_\_

**NOTE:** The prior application's correspondence address will carry over to this CPA UNLESS a new correspondence address is provided below.

**11. NEW CORRESPONDENCE ADDRESS**

Customer Number or Bar Code Label 000826

or \_\_\_\_ New correspondence address below

Attention: Andrew T. Meunier

**12. SIGNATURE OF ATTORNEY**

NAME: Andrew T. Meunier, Registration No. 40,726

SIGNATURE: 

TELEPHONE NUMBER: (704) 331-6000; FAX NUMBER: Charlotte Office (704) 334-2014

**ALSTON & BIRD LLP**

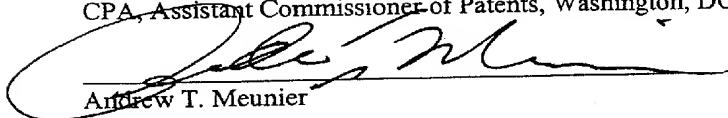
P.O. Drawer 34009

Charlotte NC 28234-4009

Express Mail" Mailing Label Number EL245786168US

Date of Deposit: February 3, 1999

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box CPA, Assistant Commissioner of Patents, Washington, DC 20231.

  
Andrew T. Meunier

Attorney's Docket No. 8867-8C

**PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Fenderson et al.	Group Unit:	1616
Appl. No.:	08/911,926	Examiner:	S. Mark Clardy
Filed:	August 15, 1997		
For:	HERBICIDAL COMPOSITIONS		
		February 3, 1999	

Assistant Commissioner for Patents  
Box CPA  
Washington, DC 20231

**PRELIMINARY AMENDMENT**

Dear Sir:

Please consider the application in view of the following remarks.

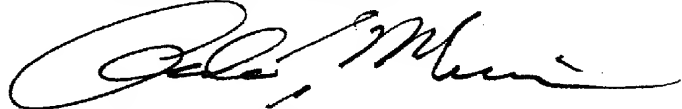
**REMARKS**

Applicants submit concurrently herewith a Continued Prosecution Application (CPA) as a response to the Official Action mailed August 4, 1998. The Official Action states that the data provided in Example 4 for the combination of dimethenamid, sulcotrione and atrazine was insufficient to demonstrate the potentiating effect of dimethenamid on sulcotrione because the information provided was incomplete. Applicants have attempted to locate the additional data needed to support this claim but have been unable to find this data. Therefore, Applicants are now conducting additional greenhouse tests to support the claim of synergistic results for the combination of dimethenamid and triketone or dione herbicides. However, these tests have yet to be completed as of the date of this Preliminary Amendment. Nevertheless, Applicants expect that the tests for the combination of dimethenamid and triketone or dione herbicides should be completed within three to four weeks from the date of this amendment. Once these tests are completed, Applicants plan to promptly submit a Preliminary Amendment demonstrating the results of these tests. In the meantime, Applicants request that the Examiner suspend this case ,

In re: Fenderson et al.  
Appl. No.: 08/911,926  
Filed: August 15, 1997  
Page 2

i.e., wait to issue an Official Action in this case until the results of these tests are provided. Alternatively, if the Examiner chooses to issue an Official Action, Applicants request that this Official Action not be given final status so the Applicant can provide the results of these tests. The undersigned is contacting the Examiner in this case to notify him of the status of this case. If the Examiner has any questions or comments regarding the case, it is requested that the Examiner contact the undersigned at the below phone number.

Respectfully submitted,



Andrew T. Meunier  
Registration No. 40,726

**ALSTON & BIRD LLP**  
P.O. Drawer 34009  
Charlotte, NC 28234  
Tel Charlotte Office (704) 331-6000  
Fax Charlotte Office (704) 334-2014  
4354119v1

"Express Mail" Mailing Label Number EL245786168US  
Date of Deposit: February 3, 1999

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Assistant Commissioner for Patents, Washington, DC 20231.



Andrew T. Meunier



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/911,926	08/15/97	FENDERSON	8867-80

HM12/0319

STEPHEN M BODEIMER JR  
THE BELL SELTZER INTELLECTUAL PROPERTY  
ALSTON & BIRD  
PORT OFFICE DRAWER 34009  
CHARLOTTE NC 28234

EXAMINER
CLARDY, S

ART UNIT	PAPER NUMBER
1616	9

DATE MAILED:

08/19/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
08/911,926

Applicant(s)

Fenderson et al

Examiner

S. Mark Clardy

Group Art Unit

1616



☒ Responsive to communication(s) filed on Feb 3, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 17-26 is/are pending in the application.

☐ Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 17-26 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☒ received in Application No. (Series Code/Serial Number) 08/236,732.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

Serial Number: 08/911,926

Page 2

Art Unit: 1616

Claims 17-26 are pending in this application which is now a CPA and a divisional of SN 08,467,367, now US Patent 5,721,191, which is a continuation-in-part of SN 08/153,946, abandoned, which is a continuation of SN 08/019,386, filed February 18, 1993, abandoned. Priority to the following applications has also been claimed: 08/152,066, 08/019,933, 08/236,732.<sup>1</sup>

Applicants have requested either a suspension of prosecution in this application, or that an office action not be made final, in order to submit new data from greenhouse testing. Therefore, this first office action in the CPA is non-final. If additional time is still required after the statutory period for response has lapsed, applicants may include another request for suspension of action, along with a response to this office action, which would be considered at that time. The following action repeats the previous first office action in this application.

Applicants' claims are drawn to a synergistic herbicidal composition comprising dimethenamid and a triketone or dione herbicide (claim 25) and herbicidal methods of use (claims 17-24); a triazine herbicide may also be included (claims 20, 26). The tri-/di-ketone herbicides may be sulcotrione (i.e., 2-(2-chloro-4-methanesulfonylbenzoyl)-1,3-cyclohexanedione), or the various 2-nitrobenzoyl bicyclooctane- or bicyclooxazine- diones discussed on page 4 of the specification.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

---

<sup>1</sup>The following related applications are being examined simultaneously:

08/911,645	08/911,715	08/911,725	08/911,911	08/911,926	08/912,087
08/912,124	08/912,134	08/912,444	08/912,449	08/914,349	08/914,799



Serial Number: 08/911,926

Art Unit: 1616

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Seckinger et al (US 4,666,502), Stauffer (EP 0 230 596), Knudsen (US 4,869,748), and Sandoz (PCT WO 92/07837).

Seckinger et al teach the herbicidal utility of dimethenamid (compound 55, col 15-16), and disclose the combination with additional biologically active agents including herbicides (col 8, lines 62-66).

Stauffer teaches sulcotrione in combination with additional herbicidal agents such as atrazine.

Knudsen and Sandoz teach applicants' herbicidal nitrobenzoyl bicyclooctanediones and oxazinediones, respectively.

One of ordinary skill in the art would be motivated to combine these references because they disclose known herbicides and because it is conventional in the art to combine herbicidal agents in a single composition.

It is noted that applicants herbicidal components are known, conventional herbicidal agents. Thus it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to have combined dimethenamid and the other herbicidal agents claimed herein because it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose in order to form a third composition that is to be used for the very same purpose; the idea of combining them flows logically from their having been individually

Serial Number: 08/911,926

Page 4

Art Unit: 1616

taught in the prior art. In re Kerkhoven, 205 USPQ 1069. Absent evidence presenting unobvious results for the combinations claimed herein, applicants are seen to have done nothing more than combine known herbicidal agents in a conventional herbicidal composition.

In example 4, applicants present data for the combination of dimethenamid (D), sulcotrione (S), and atrazine (A), comparing: A, D+A, and S+A, with D+S+A. However, in order to determine any synergistic effect, the first three compositions will need to be compared with D+S, S, and D, respectively, but that data has not been presented.

No unobvious or unexpected results are noted; no claim is allowed.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103 and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mark Clardy whose telephone number is (703) 308-4550.



S. Mark Clardy  
Primary Examiner  
AU 1616

March 18, 1999

Attorney's Docket No. 8867-8C

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Fenderson et al.  
Application No.: 08/911,926 Group No.: 1616  
Filed: August 15, 1997 Examiner: S. Mark Clardy  
For: SYNERGISTIC HERBICIDAL COMPOSITIONS OF  
DIMETHENAMID

July 19, 1999

Assistant Commissioner for Patents  
Washington, DC 20231

PETITION AND FEE FOR EXTENSION OF TIME  
(37 C.F.R. § 1.136(a))

1. This is a petition for an extension of time for a total period of one month to respond to the Official Action dated March 19, 1999.
2. A response in connection with the matter for which this extension is requested:  
☒ is filed herewith.  
☐ has been filed.
3. Applicant is  
☐ a small entity--verified statement attached.  
☐ small entity previously filed.  
☒ other than a small entity.
4. Calculation of extension fee (37 C.F.R. § 1.17(a)(1)-(a)(5)):

	<u>Total Months Requested</u>	<u>Fee For Other Than Small Entity</u>	<u>Fee for Small Entity</u>
<input checked="" type="checkbox"/>	one month	\$110.00	\$55.00
<input type="checkbox"/>	two months	\$380.00	\$190.00
<input type="checkbox"/>	three months	\$870.00	\$435.00
<input type="checkbox"/>	four months	\$1,360.00	\$680.00
<input type="checkbox"/>	five months*	\$1,850.00	\$925.00

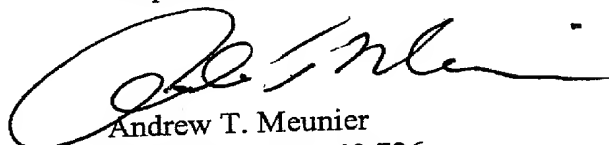
Fee Enclosed \$110.00

In re: Fenderson et al.  
Appl. No.: 08/911,926  
Filed: August 15, 1997  
Page 2

*\*Cannot be used to exceed six-month statutory  
limit for response to an Official Action.*

☒ Charge Deposit Account No. 16-0605 for any additional extension and/or fee  
required or credit for any excess fee paid.

Respectfully submitted,



Andrew T. Meunier  
Registration No. 40,726

**ALSTON & BIRD LLP**  
Post Office Drawer 34009  
Charlotte, NC 28234-4009  
Tel Charlotte Office (704) 331-6000  
Fax Charlotte Office (704) 334-2014  
CLT01/4375638v1

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an  
envelope addressed to: Assistant Commissioner For Patents, Washington, DC 20231, on July 19, 1999.



Andrew T. Meunier

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Fenderson et al.                      Group Art Unit: 1616  
Serial No. 08/911,926  
Filed: August 15, 1997                      Examiner: S. Mark Clardy  
For: SYNERGISTIC HERBICIDAL  
      COMPOSITIONS OF DIMETHENAMID

Assistant Commissioner for Patents  
Washington, DC 20231

July 19, 1999

**AMENDMENT**

Sir:

In response to the Official Action mailed March 19, 1999, please reconsider the application in view of the following amendments and remarks.

In the Claims:

17. (Amended) A method of controlling undesired plant growth in the presence of a crop comprising applying to the locus of said undesired plant growth a herbicidally effective aggregate amount of dimethenamid and a triketone or dione herbicide wherein the application rate of dimethenamid is from 0.1 to 3.0 kg/ha [and the application rate of the triketone or dione is from 0.05 to 2.0 kg/ha].

23. (Amended) A method according to claim 17 wherein the application rate of dimethenamid is from 0.25 to 1.5 kg/ha [and the application rate of the triketone or dione herbicide is from 0.1 to 0.6 kg/ha].

Please add the following new claims:

27. A method according to claim 17 wherein the dimethenamid and the triketone or dione herbicide are applied preemergence.

28. A method according to claim 17 wherein the undesired plant growth is a broadleaf weed.

29. A method according to claim 17 wherein the undesired plant growth is a grassy weed.

### REMARKS

Applicants have amended Claims 17 and 23 to remove the language related to the application rate of the triketone or dione herbicide. In addition, Applicants have added new claims 27-29. These new claims are supported, e.g., on page 7, lines 16-18. Applicants respectfully submit that these claims do not add new matter and are in proper form for examination.

Claims 17-26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combined teachings of Seckinger et al., Stauffer, Knudsen and Sandoz. In particular, the Office has taken the position that Seckinger et al. teaches the use of dimethenamid as a herbicide, that Stauffer teaches sulcotrione in combination with additional herbicides such as atrazine, and that Knudsen and Sandoz teach the use of nitrobenzoyl bicyclooctanediones and oxazinediones as herbicides. The Office concludes therefore that, absent evidence of unexpected properties, the combination of these herbicides is obvious. Furthermore, the Office has taken the position that the results in Example 4 of the present application are not sufficient to demonstrate synergistic results between dimethenamid and triketone or dione herbicides. Applicants respectfully traverse this rejection.

The cited references do not teach or suggest that dimethenamid potentiates the herbicidal activity of triketone and dione herbicides. The present application, on the other hand, discloses the unexpected herbicidal activity demonstrated by the combination of dimethenamid

In re: Fenderson et al.  
Serial No. 08/911,926  
Filed: August 15, 1997  
Page 3

and triketone and dione herbicides. Furthermore, Applicants hereby submit concurrently herewith the declaration of William O'Neal under 37 CFR 1.132 that demonstrates the potentiating effect of dimethenamid on the triketone herbicides: sulcotrione and mesotrione.

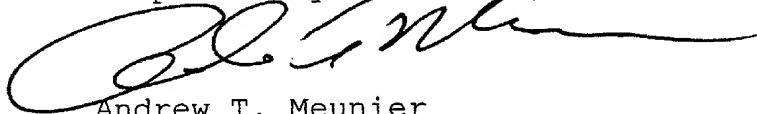
Specifically, the O'Neal declaration demonstrates that dimethenamid in combination with these triketone herbicides produces unexpected or synergistic results when applied postemergence and preemergence to representative broadleaf and grassy weeds and that similar results would be expected for broadleaf and grassy weeds in general. The O'Neal declaration also demonstrates that based on these synergistic results, synergistic results would also generally be expected for the combination of dimethenamid and other triketone herbicides. Furthermore, because triketone herbicides and dione herbicides are both HPPD inhibitors and have the same mode of action, the O'Neal declaration asserts that synergistic results would also generally be expected for the combination of dimethenamid and dione herbicides. The cited references do not teach or suggest the unexpected herbicidal activity exhibited by the combination of dimethenamid and triketone and dione herbicides. Therefore, Applicants respectfully submit that the combination of the cited references does not teach or suggest the claims as now presented and respectfully request that the rejection under 35 U.S.C. § 103 be withdrawn.

Applicants have made a significant contribution to the art neither disclosed nor suggested in any cited reference. It is submitted that all claims are in condition for immediate allowance which action is respectfully urged. Should the Examiner have questions

In re: Fenderson et al.  
Serial No. 08/911,926  
Filed: August 15, 1997  
Page 4

or suggestions, it is requested that he telephone the undersigned to expedite examination of this case.

Respectfully submitted,

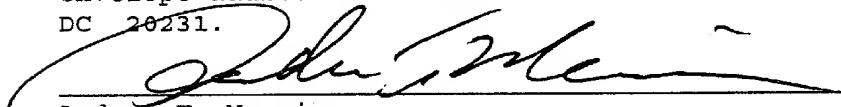


Andrew T. Meunier  
Registration No. 40,726

Alston & Bird LLP  
Post Office Drawer 34009  
Charlotte, North Carolina 28234  
Telephone: (704) 331-6000  
Facsimile: (704) 334-2014  
ATM:ek:4375590v1

**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Assistant Commissioner of Patents, Washington, DC 20231.



Andrew T. Meunier

Date of Signature: July 19, 1999



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Fenderson et al.                      Group Art Unit: 1616  
Serial No. 08/911,926  
Filed: August 15, 1997                      Examiner: S. Mark Clardy  
For: SYNERGISTIC HERBICIDAL  
      COMPOSITIONS OF DIMETHENAMID

July 19, 1999

The Honorable Commissioner of  
Patents and Trademarks  
Washington, DC 20231

DECLARATION UNDER 37 CFR 1.132

Sir:

I, William O'Neal, do hereby declare and state as follows:

1. I am employed with BASF Corporation at the Agricultural Products Center as a Senior Research Associate in Biology. I am presently involved in the technical product management for dimethenamid and other commercial and experimental products and previously was a regional Technical Manager supporting the sale of these products. I received a B.S. in Engineering Physics (1970) and a M.S. in Plant Science (1974), both from South Dakota State University. I was employed in the Agricultural Division of Velsicol Chemical Corporation from 1974 to 1986 and with Sandoz Agro, Inc. (the prior assignee) from 1986 to January, 1997. From 1986 to 1989, I was the Senior Field Development Representative for dimethenamid and dicamba herbicide testing and from 1989 to 1996, I was the Technical Product Manager for this testing. I was a member of the project team at Sandoz that ordered and evaluated tests for the combination of dimethenamid and other herbicides. As a member of this project team, I personally reviewed and evaluated the tests discussed in Paragraphs 4 and 5 below.

2. I understand that the Office has taken the position that the claimed combination of dimethenamid and dione or triketone herbicides is obvious to one of ordinary

skill in the art based on the combination of U.S. Patent No. 4,666,502 to Seckinger et al., EP 0230596 to Stauffer, U.S. Patent No. 4,869,748 to Knudsen and WO 92/07837 to Sandoz.

3. This declaration is being submitted to demonstrate that dimethenamid has a potentiating effect on the triketone herbicide sulcotrione when applied postemergence to representative broadleaf weeds and grassy weeds, and that this herbicidal combination would generally be expected to produce synergistic results on other broadleaf and grassy weeds. In addition, this declaration demonstrates that dimethenamid has a potentiating effect on the triketone herbicide mesotrione when applied preemergence on representative broadleaf and grassy weeds, and that this herbicidal combination would generally be expected to produce synergistic results on other broadleaf and grassy weeds. Furthermore, this declaration demonstrates that based on the synergistic results for the combination of dimethenamid and sulcotrione and the combination of dimethenamid and mesotrione, synergistic results would generally also be expected for the combination of dimethenamid and other triketone herbicides and for the combination of dimethenamid and dione herbicides when applied preemergence or postemergence to broadleaf weeds and grassy weeds.

4. Greenhouse trials were conducted for the combination of dimethenamid and the triketone herbicide sulcotrione. In particular, the herbicidal activities of dimethenamid, sulcotrione, and the combination of dimethenamid and sulcotrione, were tested on the broadleaf weeds *Chenopodium album* (common lambsquarters) and *Amaranthus retroflexus* (redroot pigweed), the grassy weeds *Setaria viridis* (green foxtail) and *Echinochloa crus-galli* (barnyard grass), and *Zea mays* (corn). The dimethenamid herbicide was FRONTIER® EC available from BASF Corporation and the sulcotrione herbicide was MIKADO® from Zeneca Agrochemicals.

The herbicides were applied postemergence at the following stages: broadleaf weeds (2-3 inches tall); grassy weeds (3-5 leaf stage); and corn (2-3 leaf stage). The weeds were evaluated and visually rated 18 days after treatment (DAT). The expected additive effect was calculated according to the Colby method and the synergistic effect was determined by subtracting the actual measured value by the expected additive effect. The herbicides exhibited the following representative results at the rates provided:

<b><i>Chenopodium album</i></b> control	Dimethenamid 0 gm ai/ha	Dimethenamid 1000 gm ai/ha	Expected Additive Effect	Synergistic Effect
Sulcotrione 0 gm ai/ha	0	10	---	---
Sulcotrione 50 gm ai/ha	24	75	32	+43
Sulcotrione 100 gm ai/ha	52	95	57	+38
Sulcotrione 200 gm ai/ha	75	100	78	+22

<b><i>Amaranthus retroflexus</i></b> control	Dimethenamid 0 gm ai/ha	Dimethenamid 1000 gm ai/ha	Expected Additive Effect	Synergistic Effect
Sulcotrione 0 gm ai/ha	0	10	---	---
Sulcotrione 50 gm ai/ha	10	50	19	+31
Sulcotrione 100 gm ai/ha	25	25	33	-8
Sulcotrione 200 gm ai/ha	20	85	28	+57

<b><i>Setaria viridis</i> control</b>	Dimethenamid 0 gm ai/ha	Dimethenamid 1000 gm ai/ha	Expected Additive Effect	Synergistic Effect
Sulcotrione 0 gm ai/ha	0	10	---	---
Sulcotrione 50 gm ai/ha	0	30	10	+20
Sulcotrione 100 gm ai/ha	0	55	10	+45
Sulcotrione 200 gm ai/ha	10	40	19	+21

<b><i>Echinochloa crus-galli</i> control</b>	Dimethenamid 0 gm ai/ha	Dimethenamid 1000 gm ai/ha	Expected Additive Effect	Synergistic Effect
Sulcotrione 0 gm ai/ha	0	0	---	---
Sulcotrione 50 gm ai/ha	0	60	0	+60
Sulcotrione 100 gm ai/ha	0	75	0	+75
Sulcotrione 200 gm ai/ha	35	90	35	+55

<b><i>Zea maize</i> control</b>	Dimethenamid 0 gm ai/ha	Dimethenamid 1000 gm ai/ha	Expected Additive Effect	Synergistic Effect
Sulcotrione 0 gm ai/ha	0	0	---	---
Sulcotrione 50 gm ai/ha	0	0	0	0
Sulcotrione 100 gm ai/ha	0	0	0	0
Sulcotrione 200 gm ai/ha	0	0	0	0

These tests demonstrate that the combination of dimethenamid and sulcotrione generally produces synergistic results when applied postemergence to representative broadleaf weeds and grassy weeds. Furthermore, based on these results, similar results would generally be expected for other broadleaf weeds and grassy weeds. It is noted that the combination of dimethenamid and sulcotrione is also selective and safe for

use with corn and did not damage corn at each of the application rates tested.

5. Greenhouse trials were also conducted for the combination of dimethenamid and the triketone herbicide mesotrione with the broadleaf weed *Galium aparine* (bed straw); the grassy weeds *Brachiaria platyphylla* (broadleaf signalgrass), *Digitaria sanguinalis* (large crabgrass) and *Avena fatua* (wild oats); and *Zea maize* (corn). The dimethenamid herbicide was FRONTIER® EC available from BASF Corporation. The mesotrione herbicide was synthesized by BASF Corporation for use in these trials. The herbicides were applied preemergence in the trials and the weeds and corn were evaluated and visually rated 21 days after treatment (DAT). The expected additive effect was calculated according to the Colby method and the synergistic effect was determined by subtracting the actual measured value by the expected additive effect. The herbicides exhibited the following representative results at the rates provided:

<i>Galium aparine</i> control	Dimethenamid 0 gm ai/ha	Dimethenamid 250 gm ai/ha	Expected Additive Effect	Synergistic Effect
Mesotrione 0 gm ai/ha	0	75	---	---
Mesotrione 62.5 gm ai/ha	60	95	90	+5

<i>Brachiaria platyphylla</i> control	Dimethenamid 0 gm ai/ha	Dimethenamid 62.5 gm ai/ha	Expected Additive Effect	Synergistic Effect
Mesotrione 0 gm ai/ha	0	30	---	---
Mesotrione 31.2 gm ai/ha	85	98	90	+8

<i>Digitaria sanguinalis</i> control	Dimethenamid 0 gm ai/ha	Dimethenamid 62.5 gm ai/ha	Expected Additive Effect	Synergistic Effect
Mesotrione 0 gm ai/ha	0	90	---	---
Mesotrione 31.2 gm ai/ha	80	100	98	+2

<i>Avena fatua</i> control	Dimethenamid 0 gm ai/ha	Dimethenamid 500 gm ai/ha	Expected Additive Effect	Synergistic Effect
Mesotrione 0 gm ai/ha	0	30	---	---
Mesotrione 125 gm ai/ha	20	60	44	+16

<i>Zea maize</i> control	Dimethenamid 0 gm ai/ha	Dimethenamid 500 gm ai/ha	Expected Additive Effect	Synergistic Effect
Mesotrione 0 gm ai/ha	0	0	---	---
Mesotrione 125 gm ai/ha	0	0	0	0

These tests show that the combination of dimethenamid and mesotrione produces synergistic results when applied preemergence to representative broadleaf weeds and grassy weeds. Furthermore, based on these results, similar results would generally be expected for other broadleaf weeds and grassy weeds. It is noted that the combination of dimethenamid and mesotrione was selective and safe for use with corn for the application rates tested.

6. Based on my experience and background in the field of herbicidal chemistry and activity, it is my opinion that the synergistic results produced by the postemergent application of dimethenamid and sulcotrione on representative broadleaf weeds and grassy weeds would be expected for broadleaf weeds and grassy weeds in general. In addition, it is my opinion that the synergistic results produced by the

In re: Fenderson et al.  
Serial No. 08/911,926  
Filed: August 15, 1997  
Page 7

preemergent application of dimethenamid and mesotrione on representative broadleaf weeds and grassy weeds would be expected for broadleaf weeds and grassy weeds in general. Based on the synergistic results for the combinations of dimethenamid and sulcotrione and dimethenamid and mesotrione, it is my opinion that the combination of dimethenamid and other triketone herbicides would generally be expected to produce synergistic results when applied postemergence or preemergence to broadleaf weeds and grassy weeds. Moreover, because triketone herbicides and dione herbicides are both HPPD inhibitors and have the same mode of action, it is my further opinion that the combination of dimethenamid and dione herbicides would also generally be expected to produce synergistic results when applied postemergence to broadleaf weeds and grassy weeds.

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of the application or any patent issued thereon.

July 19, 1999  
Date

William O'Neal  
William O'Neal



UNITED STATES DEPARTMENT OF COMMERCE  
Patent and Trademark Office

NOTICE OF ALLOWANCE AND ISSUE FEE DUE

HM12/0802

STEPHEN M BODEIMER JR  
THE BELL SELTZER INTELLECTUAL PROPERTY  
ALSTON & BIRD  
PORT OFFICE DRAWER 34009  
CHARLOTTE NC 28234

APPLICATION NO.			FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/911,926			08/15/97	013	CLARDY, S	1616 08/02
First Named Applicant		FENDERSON,				
		35 USC 154(b) term ext. = 0 Days.				
TITLE OF INVENTION		HERBICIDAL COMPOSITIONS COMPRISING DIMETHENAMIDE AND DIKETONE OR TRIKETONE HERBICIDES (AS AMENDED)				

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
0 8867-8C	504-130.000	W51	UTILITY	NO	\$1210.00	11/02

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED.**

**THE ISSUE FEE MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED.**

**HOW TO RESPOND TO THIS NOTICE:**

I. Review the SMALL ENTITY status shown above.  
If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is changed, pay twice the amount of the FEE DUE shown above and notify the Patent and Trademark Office of the change in status, or
- B. If the status is the same, pay the FEE DUE shown above.

If the SMALL ENTITY is shown as NO:

- A. Pay FEE DUE shown above, or
- B. File verified statement of Small Entity Status before, or with payment of 1/2 the FEE DUE shown above.

- II. Part B-Issue Fee Transmittal should be completed and returned to the Patent and Trademark Office (PTO) with your ISSUE FEE. Even if the ISSUE FEE has already been paid by charge to deposit account, Part B Issue Fee Transmittal should be completed and returned. If you are charging the ISSUE FEE to your deposit account, section "4b" of Part B-Issue Fee Transmittal should be completed and an extra copy of the form should be submitted.
- III. All communications regarding this application must give application number and batch number.  
Please direct all communications prior to issuance to Box-ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

YOUR COPY



Complete and mail this form, together with applicable fees, to:

Box ISSUE FEE  
Assistant Commissioner for F  
Washington, D.C. 20231

led

**MAILING INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Issue Fee Receipt, the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

HM12/0802

STEPHEN M BODEIMER JR  
THE BELL SELTZER INTELLECTUAL PROPERTY  
ALSTON & BIRD  
PORT OFFICE DRAWER 34009  
CHARLOTTE NC 28234

Note: The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

**Certificate of Mailing**

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/911,926	08/15/97	013	CLARDY, S	1616 08/02
1st Named Applicant: FENDERSON, 35 USC 154(b) term ext. = 0 Days.				

TITLE OF INVENTION: HERBICIDAL COMPOSITIONS COMPRISING DIMETHENAMIDE AND DIKETONE OR TRIKETONE HERBICIDES (AS AMENDED)

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
0 8867-8C	504-130.000	W51	UTILITY	NO	\$1210.00	11/02

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). Use of PTO form(s) and Customer Number are recommended, but not required.

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 \_\_\_\_\_  
2 \_\_\_\_\_  
3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)  
**PLEASE NOTE:** Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the PTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY & STATE OR COUNTRY)

Please check the appropriate assignee category indicated below (will not be printed on the patent)

☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):

☐ Issue Fee

☐ Advance Order - # of Copies \_\_\_\_\_

4b. The following fees or deficiency in these fees should be charged

DEPOSIT ACCOUNT NUMBER \_\_\_\_\_  
(ENCLOSE AN EXTRA COPY OF THIS FORM)

☐ Issue Fee

☐ Advance Order - # of Copies \_\_\_\_\_

The COMMISSIONER OF PATENTS AND TRADEMARKS IS requested to apply the Issue Fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

**Burden Hour Statement:** This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE

# Notice of Allowability

Application No.  
08/911,926

Applicant(s)  
Fenderson et al

Examiner  
S. Mark Clardy

Group Art Unit  
1616



All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance and Issue Fee Due or other appropriate communication will be mailed in due course.

- ☒ This communication is responsive to Amendment C and Declaration filed July 26, 1999
- ☒ The allowed claim(s) is/are 25, 26, 17-24, and 27-29 (Renumbered 1-13)
- ☐ The drawings filed on \_\_\_\_\_ are acceptable.
- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

- ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

A SHORTENED STATUTORY PERIOD FOR RESPONSE to comply with the requirements noted below is set to EXPIRE **THREE MONTHS** FROM THE "DATE MAILED" of this Office action. Failure to timely comply will result in ABANDONMENT of this application. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

- ☐ Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION, PTO-152, which discloses that the oath or declaration is deficient. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED.
- ☐ Applicant MUST submit NEW FORMAL DRAWINGS
- ☐ because the originally filed drawings were declared by applicant to be informal.
- ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review, PTO-948, attached hereto or to Paper No. \_\_\_\_\_
- ☐ including changes required by the proposed drawing correction filed on \_\_\_\_\_, which has been approved by the examiner.
- ☐ including changes required by the attached Examiner's Amendment/Comment.
- ☐ Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the reverse side of the drawings. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

- ☐ Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Any response to this letter should include, in the upper right hand corner, the APPLICATION NUMBER (SERIES CODE/SERIAL NUMBER). If applicant has received a Notice of Allowance and Issue Fee Due, the ISSUE BATCH NUMBER and DATE of the NOTICE OF ALLOWANCE should also be included.

## Attachment(s)

- ☐ Notice of References Cited, PTO-892
- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Interview Summary, PTO-413
- ☒ Examiner's Amendment/Comment
- ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
- ☐ Examiner's Statement of Reasons for Allowance

Application/Control Number: 08/911,926

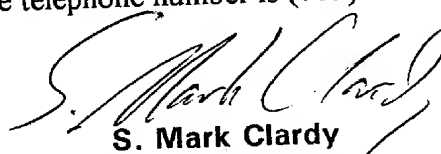
Art Unit: 1616

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows: delete the continuity data of Amendment A and substitute the following paragraph before the first line of the specification:

-- This application is a division of application Serial No. 08/467,364, filed June 6, 1995, now US Patent 5,716,901, which is a continuation of application Serial No. 08/265,594, filed June 23, 1994, abandoned, which is a continuation-in-part of application Serial No. 08/236,732, filed May 2, 1994, now US Patent 5,877,115; both application Serial No. 08/265,594, and application Serial No. 08/236,732, are continuation-in-part applications of both application Serial No. 08/153,946, filed November 16, 1993, abandoned, which is a continuation of application Serial No. 08/019,386, filed February 18, 1993, abandoned, and also application Serial No. 08/152,066, filed November 12, 1993, abandoned, which is a continuation of application Serial No. 08/019,933, filed February 19, 1993, abandoned. --

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mark Clardy whose telephone number is (703) 308-4550.

  
S. Mark Clardy  
Primary Examiner  
AU 1616

July 30, 1999

# OPEN HOUSE PROGRAM

BIO

Technology Center  
August 24-25

Location: Crystal Ball  
1999 Jefferson Davis Highway  
Arlington, VA 22202

Cost: \$70 (includes: program, lunch on 8/24, reception on 8/25)

## Program Includes:

- Patent Operations Issues
- Quality Update
- Biotech Policy
- BIO Strategic Planning
- Patent Automation Initiatives
- Town Hall Meeting
- Luncheon Speech by Q. Todd Dickinson Acting Commissioner of Patents and Trademarks
- Appeals and Interferences
- Design Issues
- Tours of the Technology Center
- Demonstrations of Automation
- Tools Including PatentIn
- Panels of SPEs on current topics

For more information or to register by phone, call 703-308-1234; your payment can be made by credit card or check made payable to "BIO"

## PART B—ISSUE FEE TRANSMITTAL

Complete and mail this form, together with a

fees, to: **Box ISSUE FEE**  
**Assistant Commissioner for Patents**  
**Washington, D.C. 20231**

**MAILING INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Issue Fee receipt, the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

HM12/0802

STEPHEN M BODEIMER JR  
THE BELL SELTZER INTELLECTUAL PROPERTY  
ALSTON & BIRD  
PORT OFFICE DRAWER 34009  
CHARLOTTE NC 28234

Note: The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

## Certificate of Mailing

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

Andrew T. Meunier

(Depositor's name)

Reg. No. 40,126

(Signature)

October 8, 1999

(Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/911,926	08/15/97	013	CLARDY, S	1616 08/02/99

Filing  
Applicant

FENDERSON,

35 USC 154(b) term ext. = 0 Days.

TITLE OF  
INVENTION

~~HERBICIDAL COMPOSITIONS OF DIMETHENAMID~~  
~~SYNERGISTIC HERBICIDAL COMPOSITIONS OF DIMETHENAMID~~  
SYNERGISTIC HERBICIDAL COMPOSITIONS OF DIMETHENAMID

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
0 8867-8C	504-130.000	W51	UTILITY	NO	\$1210.00	11/02/99

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).  
Use of PTO form(s) and Customer Number are recommended, but not required.

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☒ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached.

2. For printing on the patent front page, list  
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Alston &amp; Bird LLP

2

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)  
**PLEASE NOTE:** Unless an assignee is identified below, no assignee data will appear on the patent.  
Inclusion of assignee data is only appropriate when an assignment has been previously submitted to PTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE Sandoz Ltd.

(B) RESIDENCE: (CITY &amp; STATE OR COUNTRY) Basel, Switzerland

Please check the appropriate assignee category indicated below (will not be printed on the patent)

☐ Individual ☒ corporation or other private group entity ☐ government

4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):

☒ Issue Fee  
☒ Advance Order - # of Copies 5

4b. The following fees or deficiency in these fees should be charged to:  
DEPOSIT ACCOUNT NUMBER 16-0605  
(ENCLOSE AN EXTRA COPY OF THIS FORM)

☒ Issue Fee  
☒ Advance Order - # of Copies 5

The COMMISSIONER OF PATENTS AND TRADEMARKS IS requested to apply the Issue Fee to the application identified above.

(Authorized Signature)

(Date)

10-8-99

NOTE: The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

**Burden Hour Statement:** This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE

Attorney's Docket No. 8867-8C

**"FEE ADDRESS" INDICATION FORM**

BOX M FEE

Commissioner of Patents and Trademarks  
Washington, DC 20231

Please recognize as the "Fee Address" under the provisions of 37 C.F.R. 1.363 the following address:

**BASF Corporation**  
Sand Hill Road  
Enka, NC 28728

Payor's Telephone Number (828) 667-7685

in the following listed applications(s) or patent(s) for which the Issue Fee has been paid.

PATENT NUMBER (if known)	APPLICATION NUMBER	PATENT DATE (if known)	U.S. FILING DATE
	08/911,926		August 15, 1997

Typed name of person signing: Andrew T. Meunier

Date: 10-8-99

Signed



Owner's attorney or agent of record  
Registration No. 40,726

Address of signer:  
ALSTON & BIRD LLP  
P.O. Drawer 34009  
Charlotte, NC 28234-4009

ISSUE NOTIFICATION



UNITED STATES DEPARTMENT OF COMMERCE  
Patent and Trademark Office  
ASSISTANT SECRETARY AND COMMISSIONER  
OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NUMBER	PATENT NUMBER	ISSUE DATE	ATTORNEY DOCKET NO.
08/911,926	5990046	11/23/99	8867-8C

0046 7707  
STEPHEN M BODEIMER JR  
THE BELL SELTZER INTELLECTUAL PROPERTY  
ALSTON & BIRD  
PORT OFFICE DRAWER 34009  
CHARLOTTE NC 28234

APPLICANT(S) JOHN M. FENDERSON, KIOWA KANSAS; WILLIAM B. O'NEAL,  
BUFFALO GROVE ILLINOIS; THEO QUAGHEBEUR,  
SAINT-SYMPHORBIEBELGIUM; KARL-CHRISTOPH SCHUMM,  
CAMPINAS BRAZIL; WALTER VAN LOOCKE, MEETKERKE  
BELGIUM

Staple  
Here  
Only!

PRINTER'S TRIM LINE

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 5,990,046  
DATED : November 23, 1999  
INVENTOR(S) : Fenderson et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page, item [54], lines 1-3 and Column 1, lines 1-3:

In the title, "Herbicidal Compositions Comprising Dimethenamid And Diketone Or Triketone Herbicides" should read --Synergistic Herbicidal Compositions Of Dimethenamid--.

Column 12, line 65, "[3,2,]" should read --[3,2,1]--.

Column 13, line 2, "[3,2,]" should read --[3,2,1]--.

MAILING ADDRESS OF SENDER:

ALSTON & BIRD LLP  
Post Office Drawer 34009  
Charlotte, NC 28234-4009  
Tel Charlotte Office (704) 331-6000

PATENT NO. 5,990,046

No. of add'l. copies  
@ 30¢ per page



FORM PTO 1050 (REV. 3-82)



## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Fenderson et al.  
Application No.: 08/911,926 Group No.: 1616  
Filed: August 15, 1997 Examiner: S. Clardy  
For: HERBICIDAL COMPOSITIONS  
February 3, 1999

Assistant Commissioner for Patents  
Washington, DC 20231

PETITION AND FEE FOR EXTENSION OF TIME  
(37 C.F.R. § 1.136(a))

1. This is a petition for an extension of time for a total period of three months to respond to the Official Action dated August 3, 1998.
2. A response in connection with the matter for which this extension is requested:
- ☒ is filed herewith.  
☐ has been filed.
3. Applicant is
- ☐ a small entity--verified statement attached.  
☐ small entity already filed.  
☒ other than a small entity.
4. Calculation of extension fee (37 C.F.R. § 1.17(a)(1)-(a)(5)):

	<u>Total Months Requested</u>	<u>Fee For Other Than Small Entity</u>	<u>Fee for Small Entity</u>
<input type="checkbox"/>	one month	\$110.00	\$55.00
<input type="checkbox"/>	two months	\$380.00	\$190.00
<input checked="" type="checkbox"/>	three months	\$870.00	\$435.00
<input type="checkbox"/>	four months	\$1,360.00	\$680.00
<input type="checkbox"/>	five months*	\$1,850.00	\$925.00

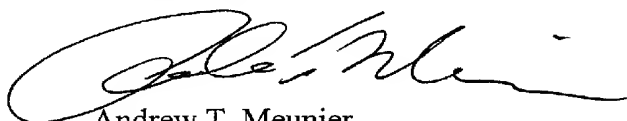
Fee Enclosed \$870.00

*\*Cannot be used to exceed six-month statutory  
limit for response to an Official Action.*

In re: Fenderson et al.  
Appl. No.: 08/911,926  
Filed: August 15, 1997  
Page 2

☒ Charge Deposit Account No. 16-0605 for any additional extension and/or fee required or credit for any excess fee paid.

Respectfully submitted,



Andrew T. Meunier  
Registration No. 40,726

**ALSTON & BIRD LLP**  
Post Office Drawer 34009  
Charlotte, NC 28234-4009  
Tel Charlotte Office (704) 331-6000  
Fax Charlotte Office (704) 334-2014  
4353972

Express Mail" Mailing Label Number EL245786168US  
Date of Deposit: February 3, 1999

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box CPA, Assistant Commissioner of Patents, Washington, DC 20231.



Andrew T. Meunier



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/911,926 ✓	08/15/1997 ✓	JOHN M. FENDERSON	8867-8C 164094	4135

7590 11/21/2007  
STEPHEN M BODEIMER JR  
THE BELL SELTZER INTELLECTUAL PROPERTY  
ALSTON & BIRD  
PORT OFFICE DRAWER 34009  
CHARLOTTE, NC 28234

EXAMINER
----------

CLARDY, S

ART UNIT	PAPER NUMBER
----------	--------------

1616

MAIL DATE	DELIVERY MODE
-----------	---------------

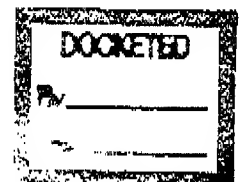
11/21/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

ut





UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

EXAMINER
----------

ART UNIT	PAPER NUMBER
----------	--------------

DATE MAILED:

NOTICE UNDER 37 CFR 1.251 - Patent

☒ The file of the above-identified patent cannot be located after a reasonable search. Therefore, the Office is initiating the reconstruction of the file of the above-identified patent pursuant to the provisions of 37 CFR 1.251.

Patentee is given a period of **SIX (6) MONTHS** from the mailing date of this notice within which to provide a copy of patentee's record (if any) of all of the correspondence between the Office and patentee for the above-identified patent (except for U.S. patent documents), a list of such correspondence, and a statement that the copy is a complete and accurate copy of patentee's record of all of the correspondence between the Office and the patentee for the above-identified patent (except for U.S. patent documents), and whether patentee is aware of any correspondence between the Office and patentee for the above-identified patent that is not among patentee's records.

☒ The following paper(s) pertaining to the above-identified patent cannot be located after a reasonable search:

Therefore, the Office is initiating the reconstruction of such paper(s) pursuant to the provisions of 37 CFR 1.251.

Patentee is given a period of **SIX (6) MONTHS** from the mailing date of this notice within which to provide a copy of the paper(s) listed above and a statement that the copy of such paper(s) is a complete and accurate copy of patentee's record of such paper(s).

Alternatively, patentee may reply to this notice by producing patentee's record (if any) of all of the correspondence between the Office and the patentee for the above-identified patent for the Office to copy (except for U.S. patent documents), and provide a statement that the papers produced by patentee are patentee's complete record of all of the correspondence between the Office and the patentee for the above-identified patent (except for U.S. patent documents), whether patentee is aware of any correspondence between the Office and the patentee for the above-identified patent that is not among patentee's records. Such records must be brought to the Customer Service Center in the Office of Initial Patent Examination (Crystal Plaza 2, 2011 South Clark Place, Arlington, VA 22202).

If patentee does not possess any record of the correspondence between the Office and the patentee for the above-identified patent (or any copy of the paper(s) listed above), patentee must reply to this notice by providing a statement that patentee does not possess any record of the correspondence between the Office and the patentee for the above-identified patent.

☒ A printout from PALM of the contents of the file of the above-identified patent is included with this notice.

Direct the reply to this notice to:

Box Reconstruction  
United States Patent and Trademark Office  
Washington, DC 20231

Direct questions concerning this notice to:

*Ronald E. Jones*  
272-1592

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

In re Patent No.: 5,990,046

Patentee: Fenderson et al.

Patent Date: November 23, 1999

Application No.: 08/911,926

Filing Date: August 15, 1997


Direct to: Box Reconstruction  
United States Patent and Trademark Office  
Washington, DC 20231

### NOTICE UNDER 37 CFR 1.251 - Patent

Statement (check the appropriate box):

- ☐ The copy submitted with this reply is a complete and accurate copy of patentee's record of all of the correspondence between the Office and the patentee for the above-identified patent (except for U.S. patent documents), and patentee is not aware of any correspondence between the Office and patentee for the above-identified patent that is not among patentee's records. \*\*\* See comments in the Response to Notice Under 37 CFR 1.251
- ☐ The copy of the paper(s) listed in the notice under 37 CFR 1.251 is/are a complete and accurate copy of patentee's record of such paper(s).
- ☐ The papers produced by patentee are patentee's complete record of all of the correspondence between the Office and the patentee for the above-identified patent (except for U.S. patent documents), and patentee is not aware of any correspondence between the Office and the patentee for the above-identified patent that is not among patentee's records.
- ☐ Patentee does not possess any record of the correspondence between the Office and the patentee for the above-identified patent.

5/21/08  
Date

  
Signature

Christopher M. Humphrey  
Typed or printed name

**A copy of this notice should be returned with the reply.**

Burden Hour Statement: This collection of information is required by 37 CFR 1.251. The information is used by the public to reply to a request for copies of correspondence between the applicant and the USPTO in order to reconstruct an application file. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This form is estimated to take 60 minutes to complete. This time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Day : Wednesday

Date: 11/21/2007

Time: 10:46:47

**PALM INTRANET****Content Information for 08/911926**Search Another: Application # or Patent# PCT / or PG PUBS # Attorney Docket # Bar Code # 







Date	Status	Code	Description
09/09/1999		SENT	WORKFLOW - FILE SENT TO CONTRACTOR
10/25/2001		N423	POST ISSUE COMMUNICATION - CERTIFICATE OF CO
11/23/1999		PGM/	RECORDATION OF PATENT GRANT MAILED
11/15/1999	150	WPIR	ISSUE NOTIFICATION MAILED
10/14/1999	95	N084	ISSUE FEE PAYMENT VERIFIED
11/04/1999		PILS	APPLICATION IS CONSIDERED READY FOR ISSUE
08/02/1999	92	MN/=.	MAIL NOTICE OF ALLOWANCE
08/02/1999	90	N/=.	NOTICE OF ALLOWANCE DATA VERIFICATION COM
08/02/1999		MEX.A	MAIL EXAMINER'S AMENDMENT
08/02/1999		EX.A	EXAMINER'S AMENDMENT COMMUNICATION
07/30/1999	89	CNTA	NOTICE OF ALLOWABILITY
07/30/1999		FWDX	DATE FORWARDED TO EXAMINER
07/26/1999	71	A...	RESPONSE AFTER NON-FINAL ACTION
07/26/1999		XT/G	REQUEST FOR EXTENSION OF TIME - GRANTED
03/19/1999	41	MCTNF	MAIL NON-FINAL REJECTION
03/18/1999	40	CTNF	NON-FINAL REJECTION
02/10/1999		FWDX	DATE FORWARDED TO EXAMINER
02/03/1999	71	ACPA	CONTINUING PROSECUTION APPLICATION - CONTIN
02/03/1999		MABN3	MAIL EXPRESS ABANDONMENT (DURING EXAMINA
02/03/1999	168	ABN3	EXPRESS ABANDONMENT (DURING EXAMINATION)
02/03/1999		XT/G	REQUEST FOR EXTENSION OF TIME - GRANTED
08/04/1998	41	MCTNF	MAIL NON-FINAL REJECTION
08/03/1998	40	CTNF	NON-FINAL REJECTION

08/15/1997		A.PE	PRELIMINARY AMENDMENT
08/15/1997		A.PE	PRELIMINARY AMENDMENT
08/15/1997		M844	INFORMATION DISCLOSURE STATEMENT (IDS) FILE
08/15/1997		WIDS	INFORMATION DISCLOSURE STATEMENT (IDS) FILE
03/13/1998	30	DOCK	CASE DOCKETED TO EXAMINER IN GAU
01/07/1998	20	OIPE	APPLICATION DISPATCHED FROM OIPE
12/01/1997		SCAN	IFW SCAN & PACR AUTO SECURITY REVIEW
09/08/1997	19	IEXX	INITIAL EXAM TEAM NN

[Appn Info](#) [Contents](#) [Petition Info](#) [Atty/Agent Info](#) [Continuity/Reexam](#) [Foreign Data](#)

To go back use Back button on your browser toolbar.

Back to [PALM](#) | [ASSIGNMENT](#) | [OASIS](#) | [Home page](#)

### HERBICIDAL COMPOSITIONS

5 This is a continuation-in-part of application Serial No. 08/153,946, filed November 16, 1993 which is a continuation of application Serial No. 08/019,386, filed February 18, 1993 and a continuation-in-part of application Serial No. 152,066, filed November 12, 1993 which is a continuation of application Serial No. 08/019,933, filed February 19, 1993 and a continuation-in-part of application Serial No. 08/236,732, filed May 2, 1994.

10 The present invention concerns a method of controlling undesired plant growth employing co-application of dimethenamid and at least one other herbicide, herbicidal compositions comprising dimethenamid and at least one other herbicide and the use of such compositions in controlling undesired plant growth.

15 Dimethenamid (FRONTIER®) whose chemical name is 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-(2-methoxy-1-methylethyl)-acetamide, processes for its production, herbicidal compositions containing it and its use as a herbicide are described in US Patent 4,666,502 the contents of which are incorporated herein by reference. Dimethenamid consists of 4 stereoisomers due to two chiral elements and can thus also exist in the form of the individual isomers as diastereomeric mixtures (1S, aRS (known as S-dimethenamid) and 1R, 20 aRS (known as R-dimethenamid)) and as a racemic mixture (1RS, aRS). References herein to dimethenamid refer to its various forms unless otherwise stated. Of the diastereomeric mixtures S-dimethenamid is preferred.

25 The term herbicides, as used herein, refers to compounds which combat or control undesired plant growth. This class of compounds may be divided into sub-classes according to the primary type or mode of action the herbicide has on the plant. For example according to G.F. Warren of Purdue University, Indiana, USA, herbicides can be classified as auxin transport inhibitors, growth regulator herbicides, photosynthesis inhibitors, pigment



inhibitors, growth inhibitors, amino acid synthesis inhibitors, lipid biosynthesis inhibitors, cell wall biosynthesis inhibitors, rapid cell membrane disruptors as well as "miscellaneous" herbicides which do not come under one of the preceding categories.

5           It has now surprisingly been found that co-application of dimethenamid and at least one other herbicide results in better and in some cases longer-lasting control of undesired plant growth. This synergistic effect exhibits itself in a high degree of control at co-application rates which are significantly lower than the rate of each individual compound required to obtain the same degree of control. Furthermore, at any given co-application  
10       rate the degree of control is higher than the additive effect obtained for the individual components at the same rate. In some cases both speed of activity and level of control are enhanced and/or weeds can be controlled which are not controlled by either component at economical rates.

15           This synergistic effect allows for satisfactory control at reduced application rates for each component and even at levels which if applied for a particular component alone would give insufficient control. Additionally, longer residual control may be achieved. This provides for significant economic and environmental advantages in the use of dimethenamid and the herbicide(s) used in combination therewith.

20           Co-application can be achieved using tank mixes of preformulated individual active ingredients, simultaneous or sequential (preferably 1-2 days) application of such formulations or application of preformulated fixed pre-mix combinations of the individual active ingredients.

25           Examples of herbicides which may be used in combination with dimethenamid in accordance with the invention include

1.     auxin transport inhibitors, e.g. naptalam
2.     growth regulators, including 1) benzoic acids, e.g. dicamba; b) phenoxy acids

- i) acetic acid type, e.g. 2,4-D, MCPA, ii) propionic acid type, e.g. 2,4-DP, MCPP, iii) butyric acid type, e.g. 2,4-DB, MCPB; c) picolinic acids and related compounds, e.g. picloram, triclopyr, fluroxypyr, clopyralid
3. photosynthesis inhibitors, including a) s-triazines i) chloro substituted, e.g. atrazine, simazine, cyanazine, ii) methoxy substituted, e.g. prometon, iii) methylthio substituted, e.g. ametryn, prometryn; b) other triazines, e.g. hexazinone, metribuzin; c) substituted ureas, e.g. diuron, fluometuron, linuron, tebuthiuron, thidiazuron, forchlorfenuron; d) uracils, e.g. bromacil, terbacil; e) others, e.g. bentazon, desmedipham, phenmedipham, propanil, pyrazon, pyridate
4. pigment inhibitors, including a) pyridazinones, e.g. norflurazon; b) isoxazolones, e.g. clomazone; c) others, e.g. amitrole, fluridone
5. growth inhibitors, including a) mitotic disruptors i) dinitroanilines, e.g. trifluralin, prodiamine, benefin, ethalfluralin, isopropalin, oryzalin, pendimethalin; ii) others, e.g. DCPA, dithiopyr, thiazopyr, pronamide; b) inhibitors of shoots of emerging seedlings i) thiocarbamates, e.g. EPTC, butylate, cycloate, molinate, pebulate, thiobencarb, triallate, vernolate; c) inhibitors of roots only of seedlings, e.g. bensulide, napropamide, siduron; d) inhibitors of roots and shoots of seedlings, including chloroacetamides e.g. alachlor, acetochlor, metolachlor, diethatyl, propachlor, butachlor, pretilachlor, metazachlor, dimethachlor, and others e.g. cinmethylin
6. amino acid synthesis inhibitors, including a) glyphosate, glufosinate; b) sulfonylureas, e.g. rimsulfuron, metsulfuron, nicosulfuron, triasulfuron, primisulfuron, bensulfuron, chlorimuron, chlorsulfuron, sulfometuron, thifensulfuron, tribenuron, ethametsulfuron, triflusulfuron, clopyrasulfuron, pyrazasulfuron, prosulfuron (CGA-152005), halosulfuron, metsulfuron-methyl, chlorimuron-ethyl; c) sulfonamides, e.g. flumetsulam (a.k.a. DE498); d) imidazolinones, e.g. imazaquin, imazamethabenz, imazapyr, imazethapyr, imazmethapyr

7. lipid biosynthesis inhibitors, including a) cyclohexanediones, e.g. sethoxydim, clethodim; b) aryloxyphenoxys, e.g. fluazifop-(P-butyl), diclofop-methyl, haloxyfop-methyl, quizalofop; c) others e.g. fenoxaprop-ethyl
8. cell wall biosynthesis inhibitors, e.g. dichlobenil, isoxaben
9. rapid cell membrane disruptors, including a) bipyridiliums, e.g. paraquat, diquat; b) diphenyl ethers, e.g. acifluorfen, fomesafen, lactofen, oxyfluorfen; c) glutamine synthetase inhibitors, e.g. glufosinate; d) others, e.g. oxadiazon
10. miscellaneous, including a) carbamates, e.g. asulam; b) nitriles, e.g. bromoxynil, ioxynil; c) hydantocidin and derivatives; d) various, e.g. paclobutrazol, ethofumesate, quinclorac (a.k.a. BAS514), difenzoquat, endothall, fosamine, DSMA, MSMA

11. Others

a) triketones and diones of the type described in US Patents 4,695,673; 4,869,748; 4,921,526; 5,006,150; 5,089,046, US Patent Applications 07/411,086 (and EP-A-338,992); and 07/994,048 (and EP-A-394,889 and EP-A-506,907) as well as EP-A-137,963; EP-A-186,118; EP-A-186,119, EP-A-186,120; EP-A-249,150; EP-A-336,898; the contents of each of which are incorporated herein by reference. Examples of such triketones and diones are sulcotrione (MIKADO®) whose chemical designation is 2-(2-chloro-4-methanesulfonylbenzoyl)-1,3-cyclohexane dione; 2-(4-methylsulfonyloxy-2-nitrobenzoyl)-4,4,6,6-tetramethyl-1,3-cyclohexanedione; 3-(4-methylsulfonyloxy-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 3-(4-methylsulfonyl-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(4-chloro-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)dione; 4-(4-methylthio-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)-dione; 3-(4-methylthio-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(2-nitro-4-trifluoromethoxybenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)-dione.

b) Compounds of the type described in US Patent Applications 08/036,006 (and EP-A-461,079 and EP-A-549,524); EP-A-315,889; and PCT Appln. No. 91/10653 the contents of each of which are incorporated herein by reference including for example

3-[(4,6-dimethoxy-2-pyrimidinyl)hydroxymethyl]-N-methyl-2-pyridine carboxamide; 4,7-dichloro-3-(4,6-dimethoxy-2-pyrimidinyl)-3-hexanoyloxyphthalide; 3-[(4,6-dimethoxy-2-pyrimidinyl)carbonyl]-N,N-dimethyl-2-pyridine carboxamide; 3,6-dichloro-2-[(4,6-dimethoxy-2-pyrimidinyl)carbonyl]benzoic acid; 6-chloro-2-[(4,6-dimethoxy-2-pyrimidinyl)thio]benzoic acid (a.k.a. DPX-PE350 or pyrithiobac) and salts thereof.

The present invention therefore concerns a method of combatting or controlling undesired plant growth or otherwise regulating plant growth which comprises co-applying to a locus where such combatting or control is desired an herbicidally or plant growth regulating effective aggregate amount of dimethenamid and at least one other herbicide.

Application rates for co-application will of course vary depending upon climatic conditions, season, soil ecology, weeds to be combatted and the like, however, successful results can be obtained e.g. with rates of dimethenamid of 0.1 to 3.0 kg/ha, preferably 0.1 to 2.0 kg/ha, especially 0.25 to 1.5 kg/ha e.g. 0.9 to 1.5 kg/ha in co-application with rates for partner herbicides which correspond to or are significantly lower than recommended for use thereof individually.

The suitability of specific co-applications for pre- or post-emergent uses and selectively will of course depend on the partners chosen.

The activity of dimethenamid is described in the above mentioned patents and that of suitable herbicidal partners is described in the literature or on commercially available forms thereof (cf also CROP PROTECTION CHEMICALS REFERENCE, 9th edition (1993) Chemical & Pharmaceutical Press, NY, NY; The Pesticide Manual, 9th edition (1991), British Crop Protection Council, London; Ag Chem New Product Review, Ag Chem Information Services, Indianapolis, Indiana; Farm Chemicals Handbook, 1993 edition, Meister Publishing Company, Willoughby, Ohio and the like).

The invention also provides herbicidal or plant growth regulating compositions comprising an herbicidally effective aggregate amount of dimethenamid and at least one other herbicide.

5 Such compositions contain the active substances in association with agriculturally acceptable diluents. They may be employed in either solid or liquid forms e.g. in the form of a wettable powder or an emulsifiable concentrate, incorporating conventional diluents. Such compositions may be produced in conventional manner, e.g. by mixing the active ingredient with a diluent and optionally other formulating ingredients such as surfactants and oils.

10 The term diluents as used herein means any liquid or solid agriculturally acceptable material which may be added to the active constituent to provide a more easily or improved applicable form, or to achieve a usable or desirable strength of activity. Examples of diluents are talc, kaolin, diatomaceous earth, xylene, non-phytotoxic oils, or water.

15 Particular formulations, to be applied in spraying forms such as water dispersible concentrates or wettable powders, may contain surfactants such as wetting and dispersing agents, e.g. the condensation product of formaldehyde with naphthalene sulphonate, an alkylarylsulphonate, a lignin sulphonate, a fatty alkyl sulphate, an ethoxylated alkylphenol  
20 or an ethoxylated fatty alcohol.

In general, the formulations include from 0.01 to 90% by weight of active agent(s) and from 0 to 20% by weight of agriculturally acceptable surfactant, the active agent consisting of dimethenamid and at least one other herbicide. Concentrate forms of  
25 compositions generally contain between about 2 and 90%, preferably between about 5 and 80% by weight of active agent. Application forms of formulation may for example contain from 0.01 to 20% by weight of active agent.

When employing concurrent, immediately sequential or tank mix applications the

herbicide partner(s) can be employed in commercially available form if appropriate and at rates equivalent to or preferably below those recommended by the manufacturer or in the references cited above. Dimethenamid can also be applied in commercially available form (e.g. as FRONTIER® herbicide) or as formulated e.g. as described in the above-mentioned  
5 USP 4,666,502.

On co-application according to the present invention other compounds having biological activity, e.g. compounds having insecticidal or fungicidal activity, may also be included.

10 The preferred mode of application is tank mix prepared e.g. by adding dimethenamid to a tank containing the other herbicide partner and an appropriate surfactant or vice versa depending on the type of herbicide partner chosen. It is advisable to consult labels of mixing partners and to conduct compatibility tests prior to mixing.

15 Depending on the choice of co-application partners both pre- and post- emergence activity on a large range of broadleaf and grassy weeds may be achieved. Examples of such weeds are

- 20 Agropyron repens - quackgrass  
Brachiaria platyphylla - broadleaf signalgrass  
Bromus spp - e.g. downybrome  
Cenchrus spp. - e.g. southern sandbur, sandbur, field sandbur  
Dactyloctenium aegyptium - crowfootgrass  
25 Digitaria spp - e.g. crabgrass, smooth crabgrass, large crabgrass  
Echinochloa crus-galli - barnyardgrass  
Eleusine indica - goosegrass  
Eriochloa spp. - e.g. southwestern cupgrass, prairie cupgrass, woolly cupgrass  
Leptochloa filiformis - red spangletop

- Oryza sativa - red rice
- Panicum spp - e.g. witchgrass and fall-, browntop- and texas-panicum, wild proso millet
- Poa annua - annual bluegrass
- Setaria spp - e.g. giant foxtail, foxtail millet, yellow foxtail, bristly foxtail, green foxtail
- 5 Sorghum alnum - sorghum alnum
- Sorghum bicolor - shattercane
- Sorghum halepense - seedling johnson grass
- Urochloa panicoides - liverseedgrass
- Acanthospermum hispidum - bristly starbur
- 10 Amaranthus spp - e.g. pigweed, tumble pigweed; smooth pigweed, redroot pigweed,  
prostrate pigweed, waterhemp, spiny amaranth
- Ambrosia artemisiifolia - common ragweed
- Bidens pilosa - hairy beggarticks
- Capsella bursa-pastoris - shepherdspurse
- 15 Chenopodium album - common lambsquarters
- Cleome monophylla - spindlepod
- Commelina spp - e.g. dayflower
- Crotalaria sphaerocarpa -
- Datura stramonium - jimsonweed
- 20 Desmodium tortuosum - Florida beggarweed
- Euphorbia nutans - nodding spurge
- Euphorbia maculata - spotted spurge
- Galinsoga parviflora - smallflower galinsoga
- Ipomea spp. - e.g. ivyleaf-, tall-, pitted morningglory
- 25 Lamium purpureum - purple deadnettle
- Matricaria chamomilla - wild chamomile
- Mollugo verticillata - carpetweed
- Papaver rhoeas - corn poppy
- Polygonum spp. - e.g. smartweed, annual smatweed, wild buckwheat, prostrate knotweed

- Portulaca oleracea - common purslane
- Richardia scabra - Florida pusley
- Schkuhria pinnata - dwarf marigold
- Sida spinosa - prickly sida
- 5 Solanum spp. - e.g. black nightshade, E. black nightshade, hairy nightshade, silverleaf nightshade
- Stellaria media - common chickweed
- Tagetes minuta - wild marigold (khaki weed)
- Cyperus esculentis - yellow nutsedge
- 10 Cyperus iria - rice flatsedge

In addition the following weeds may also be controlled when employing appropriate mixing partners.

- 15 Abutilon theophrasti - velvetleaf
- Hibiscus trionum - Venice mallow
- Avena fatua - wild oats
- Sinapis alba - white mustard
- Xanthium strumarium - common cocklebur
- 20 Cassia obtusifolia - sicklepod
- Apera spica-venti - windgrass
- Campsis radicans - trumpet creeper
- Rottboellia exaltata - itchgrass
- Cynodon dactylon - bermudagrass
- 25 Lespedeza spp. - e.g. lespedezas
- Trifolium spp. - e.g. clovers
- Hippuris vulgaris - marestail
- Asclepias spp. - e.g. milkweeds
- Salvia spp. - e.g. lanceleaf sage



Salsola iberica - Russian thistle

Convolvulus arvensis - field bindweed

Cirsium arvense - Canada thistle

Proboscidea louisianica - devilsclaw

5 Senecio spp. - e.g. common groundsel

Chorisporea tennela - blue mustard

Alopecurus myosuroides - blackgrass

Sisymbrium altissimum - tumble mustard

Caperionia palustris - texasweed

10

Crop selectivity will also usually depend upon choice of partners. Dimethenamid exhibits excellent selectivity in corn (maize), soybean and several other crops.

Examples of particular partners for co-application with dimethenamid include these  
15 selected from one or more of the types listed under a) through w) below.

a. benzoic acids, e.g. dicamba

b. picolinic acids and related compounds, e.g. picloram, triclopyr, fluroxypur, clopyralid

20 c. phenoxys, e.g. 2,4-D, 2,4-DB, triclopyr, MCPA, MCPP, 2,4-DP, MCPB

d. other chloracetamides, e.g. alachlor, acetochlor, metolachlor, diethatyl, propachlor, butachlor, pretilachlor, metazachlor, dimethachlor especially metolachlor, alachlor, acetochlor

e. amides, e.g. propanil, naptalam

25 f. carbamates, e.g. asulam

g. thiocarbamates, e.g. EPTC, butylate, cycloate, molinate, pebulate, thiobencarb, triallate, vernolate

h. nitriles, e.g. bromoxynil, ioxynil

i. ureas, e.g. diuron, thidiazuron, fluometuron, linuron, tebuthiuron,

- forchlorfenuron
- 5 j. triazines, e.g. atrazine, metribuzin, cyanazine, simazine, prometon, ametryn, prometryn, hexazinone
- k. diphenyl ethers, e.g. acifluorfen, fomesafen, lactofen, oxyfluorfen
- l. dinitroanilines, e.g. trifluralin, prodiamine, benefin, ethalfluralin, isopropalin, oxyzalin, pendimethalin
- m. sulfonylureas e.g. rimsulfuron, metsulfuron, nicosulfuron, triasulfuron, primisulfuron, bensulfuron, chlorimuron, chlorsulfuron, sulfometuron, thifensulfuron, tribenuron, ethametsulfuron, triflusulfuron, clopyrasulfuron, pyrazasulfuron, prosulfuron (CGA-152005), halosulfuron, metsulfuron-methyl, chlorimuron-ethyl;
- 10 n. imidazolinones, e.g. imazaquin, imazamethabenz, imazapyr, imazethapyr, imazmethapyr
- o. cyclohexanediones, e.g. sethoxydim
- 15 p. aryloxyphenoxys, e.g. fluazifop
- q. bipyridiliums, e.g. paraquat, diquat
- r. pyridazinones, e.g. norflurazon
- s. uracils, e.g. bromacil, terbacil
- t. isoxazolones, e.g. clomazone
- 20 u. various, e.g. glyphosate, glufosinate, methazole, paclobutrazol, bentazon, desmedipham, phenmedipham, pyrazon, pyridate, amitrole, fluridone, DCPA, dithiopyr, pronamide, bensulide, napropamide, siduron, flumetsulam, sethoxydim, fluazifop, clethodim, diclofop-methyl, fenoxaprop-ethyl, haloxyfop-methyl, quizalofop, diclobenil, isoxabenz, oxadiazon, paclobutrazol, ethofumesate, quinclorac, difenzoquat, entothall, fosamine, DSMA, MSMA
- 25 v. Group 11a "others" as described above.
- w. Group 11b "others" as described above.

Especially preferred partners among groups a) through w) are those of groups a), m),

n), u) and v), i.e. the sulfonylureas and the triketones and diones.

The co-application of the combination of dimethenamid and triketone(s) or dione(s) according to present invention is especially suitable in crops of monocotyledons, such as cereals, maize and rice. However, application in maize crops being infested with monocotyledonous and dicotyledonous weeds is most advantageous, as harmful effects against the crop plants are not enhanced. Both pre- and postemergence application to the undesired weeds is possible with this preferred combination. However, the preferred time point of application in maize is after emergence of the maize seedlings.

Application rates for co-application of dimethenamid and a triketone or dione will of course vary depending upon climatic conditions, season, soil ecology, weeds to be combatted and the like, however, successful results can be obtained, e.g. in co-application with rates of the triketone or dione which are significantly lower than recommended for use thereof alone; e.g. 0.01 to 2 kg/ha, preferably 0.1 to 1 kg/ha, especially 0.1 to 0.6 kg/ha.

From this group, combinations are preferred wherein the triketone or dione is selected from 4-(4-chloro-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5-(4H,6H) dione, and sulcotrione, with sulcotrione being preferred.

The most preferred combination of this type is that of sulcotrione and dimethenamid. The mixture ratio will be determined according to the specific soil, crop and climate condition of use. As an example the co-application rates will be in the range of 0.9 to 1.5 kg/ha of dimethenamid and 0.15 to 0.45 kg/ha of sulcotrione. The ratio of the active ingredient in the composition by weight of sulcotrione and dimethenamid is between 1:2 and 1:10.

For the co-application in a preferred 3-way mix comprising dimethenamid and a triketone or dione of group v), the third component is preferably selected from the group

j), i.e. the group of triazine herbicides. In a typical 3-way mix the triazine component will be present in a ratio of 3:1 to 1:3 relative to the dimethenamid content, with an excess of dimethenamid being preferred, i.e. a preferred ratio of 1:1 to 1:3, e.g. 1 : 1.5. The preferred triazine herbicide in this type of a 3-way mix is atrazine.

5

The co-application of the combination of dimethenamid and sulfonylurea(s) according to present invention is especially suitable in crops of monocotyledons, such as cereals, maize, sugar cane and rice. For example, application in sugar cane being infested with monocotyledonous and dicotyledonous weeds is particularly advantageous, as the harmful effects against the crop plants are not enhanced, but the weeds are controlled very effectively. Both pre- and postemergence applications to the undesired weeds is possible with this combination. However, the preferred time point of application to sugar cane is after emergence of the sugar cane seedlings, or transplantation of ratoon cane.

10

15

In this use the application rates for co-application of dimethenamid and a sulfonylurea will of course vary depending upon climatic conditions, season, soil ecology, weeds to be combatted and the like, however, successful results can be obtained, e.g. in co-application with rates of the sulfonylurea which are significantly lower than the recommended use thereof alone; e.g. 1 to 150 g/ha, preferably 10 to 100 g/ha.

20

25

From this group the preferred combination for control of weeds in sugar cane is one wherein the sulfonylurea is chlorimuron. The mixture ratio will be determinable according to the specific soil, crop and climate condition of use. As an example the co-application rates will be in the range of 0.9 to 3.0 kg/ha of dimethenamid and 10 to 100 g/ha of chlorimuron. For the combatting of cyperus spp. in sugar cane crop they may be for example 2.0 to 3.0 kg/ha of dimethenamid and 50 to 90 g/ha of chlorimuron. The ratio of active ingredient in the composition by weight of chlorimuron and dimethenamid is between 1:3000 and 1:20, preferably 1:30 to 1:60, e.g. 1:34 or 1:38 or 1:45.

For the co-application in a preferred 3-way mix comprising dimethenamid and a sulfonylurea of group m), the third component is preferably selected from the group i), i.e. the group of urea herbicides. In a typical 3-way mix the urea component will be present in a ratio of 2:1 to 1:4, relative to the dimethenamid content, with an excess of dimethenamid being preferred, i.e. a preferred ratio of 1:1 to 1:3, e.g. 1:2. The preferred urea herbicide in this type of a 3-way mix is diuron.

It will be appreciated that mixtures of dimethenamid with more than one herbicide e.g. 3-way mixes are also included within the purview of the invention.

Examples of specific mixing partners can be selected for example from the following: paraquat (e.g. as GRAMOXONE® or GRAMOXONE®EXTRA), simazine (e.g. as PRINCEP®), glyphosate (e.g. as ROUNDUP®), glufosinate (e.g. as BASTA®); (Compound Group I).

Further examples of specific mixing partners can be selected from the following: atrazine, cyanazine (e.g. as BLADEx® or together with atrazine as EXTRAZINE® or EXTRAZINE®II) terbutylazine, pendimethalin (e.g. as PROWL®), metribuzin, linuron (Compound Group II).

Further examples of specific mixing partners can be selected from the following: nicosulfuron (e.g. as ACCENT®) rimsulfuron (e.g. as TITUS®) and primisulfuron (e.g. as BEACON®) (Compound Group III).

Further examples of specific mixing partners can be selected from the following: imazethapyr (e.g. as PURSUIT®), imazaquin (e.g. as SCEPTER®), chloramben, aclonifen (Compound Group IV).

Further examples of specific mixing partners can be selected from the following:

dicamba (e.g. as BANVEL®, as CLARITY® (in DGA salt form) or together with atrazine as MARKSMAN®).

5 Further examples of specific mixing partners can be selected from sethoxydim (e.g. as POAST®), fluazifop (e.g. as FUSILADE®) (Compound Group V).

Further examples of specific mixing partners can be selected from the following: sulcotrione (e.g. as MIKADO®) and 4-(4-chloro-2-nitro-benzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5-(4H,6H) dione (Compound Group VI).

10

Further examples of specific mixing partners for 3-way mix are sulcotrione (e.g. as MIKADO®) and atrazine (e.g. as GESAPRIM®) (Compound Group VIa).

15 Further examples of specific mixing partners include chlorimuron (e.g. as CLASSIC® or in a 3-way mix together with diuron as FRONT®) (Compound Group VII).

According to the desired weed spectrum, time of application and the like other specific herbicides listed within the groups a) through w) above are also particular examples of suitable mixing partners.

20

It has now also been found that very efficient control of grassy weeds in crops of sugar cane can also be with herbicides of the class of chloracetamides in co-application with at least one herbicide of the class of sulfonylurea herbicides (group m) optionally in the presence of at least one herbicide of the class of the urea herbicide (group i). These components synergistically enhance the herbicidal effect of the mixture. The chloroacetamides are widely used in agricultural practice. Preferred species of this group are inter alia Alachlor (LASSO®) whose chemical designation is 2-chloro-2',6'-diethyl-N-methoxymethyl-acetanilide; Acetochlor (HARNESS®) whose chemical designation is 2-chloro-N-(ethoxymethyl)-N-(2-ethyl-6-methylphenyl)acetamide; Metolachlor (DUAL®) whose

25

chemical designation is 2-chloro-6'-ethyl-N-(2-methoxy-1-methylethyl)-aceto-toluidide; Metazachlor (BUTISAN S®) whose chemical designation is 2-chloro-N-(pyrazol-1-yl-methyl)acet-2',6'-xylydide; and dimethenamid (FRONTIER®) whose chemical designation is 2-chloro-N(2,4-dimethyl-3-thienyl)-N-(2-methoxy-1-methylethyl)-acetamide.

Application rates of chloroacetamides for co-application will of course vary depending upon climatic conditions, season, soil ecology, weeds to be combatted and the like, however, successful results in sugar cane can be obtained e.g. with rates of the chloroacetamide of 1 to 6 kg/ha. preferably 2 to 5.5 kg/ha in co-application with sulfonylurea and urea herbicides. For example the specific application rates of the chloroacetamide component is 3 to 6 kg/ha for Alachlor, e.g. 5.9 kg/ha, and 3 to 5 kg/ha for Metolachlor, e.g. 4.3 kg/ha.

The mixture ratio of the chloroacetamide herbicide with the sulfonylurea is generally between 20:1 and 300:1, preferably 20:1 to 100:1, e.g. 30:1 or 90:1. When a urea herbicide is co-applied with the mixture of a chloroacetamide and a sulfonylurea it may preferably be applied in a ratio of 1:1 to 1:5, relative to the chloroacetamide. e.g. 1:2 or 1:3 or 1:4. The preferred chloroacetamides other than dimethenamid to be applied in sugar cane with chlorimuron and diuron are acetochlor or metolachlor.

Thus, another aspect of present invention is the control of grassy weeds in sugar cane with a combination of a chloroacetamide in association with a sulfonylurea and an urea herbicide. Specific preferred combinations for this use are mixtures of dimethenamid, acetochlor, alachlor or metolachlor with a combination of chlorimuron and diuron, e.g in the commercially available 1:19 mixture FRONT®.

### EXAMPLE 1

Active ingredients are weighed and dissolved in a stock solution consisting of acetone:deionized water, 1:1, and 0.5% adjuvant mixture consisting of surfactants SPAN® 20:TWEEN® 20:TWEEN® 85, 1:1:1. Dilutions from this stock solution are performed to allow for preparation of spray solutions consisting of single doses of individual or combined active ingredients. Each dose is applied simultaneously via a linear track sprayer set to deliver 600 liters/ha spray volume to both the foliage of the selected weed seedling species, postemergence application, and the surface of soil that had been previously sown with seeds, preemergence application. The seedlings used are cultured to develop plants at the two- to early three-leaf stage. The stage of development of each seedling at application time is recorded. After application, the treated plants are transferred to the greenhouse and held until termination of the experiment within four weeks. Symptoms of injury are recorded two and ten days after postemergence application and fourteen days after preemergence application. Visual percentage ratings of crop injury and weed control are taken ten and twenty-eight days after postemergence application and fourteen and twenty-eight days after preemergence application.

Co-application of dimethenamid with other specific active ingredients such as outlined above produces improved herbicidal effects compared with application of each active ingredient alone.

### EXAMPLE 2

A field trial is carried out employing dimethenamid (as FRONTIER® 7.5 EC) and nicosulfuron (as ACCENT® 75 WDG) in control of large crabgrass in corn. Application is as tankmix combination at early post-emergence of the weeds (3 and 4 leaf stages). Application rates of a.i. are 1.5 and 0.75 kg/ha for dimethenamid and 37.2 and 19.2 g/ha for nicosulfuron. Combined application of 0.75 kg/ha of dimethenamid and 19.2 g/ha of nicosulfuron gave 85% control with negligible corn damage compared with 35% for nicosulfuron applied alone at 19.2 g/ha and 72% for dimethenamid at a higher rate of 1.25



kg/ha. Combined application at the higher rate of dimethenamid with 37.2 g/ha of nicosulfuron gave an even more dramatic effect with 95% control compared with 72% for dimethenamid and only 45% for nicosulfuron each alone.

5        Similar effects are noticed on combined treatment of broadleaf weeds such as lambsquarters, prickly sida and morningglory employing 1.12 kg/ha of dimethenamid (as FRONTIER®) and 0.071 kg/ha of imazethapyr (as PURSUIT®).

### EXAMPLE 3

10        Small field units in a maize field, infested with *echinochloa crus galli* and *solanum nigrum* are sprayed with a tank-mix suspension of dimethenamid and sulcotrione. The stage of the weeds is "full tillering" for *echinochloa crus galli* and "8-leaves stage" for *solanum nigrum*. The lot size is 8 meters in length and 3 meters in width. The application rates are 1.1 kg/ha of dimethenamid and 0.15 kg/ha of sulcotrione. Seven days after treatment the  
15        efficacy is evaluated, both as control of the weeds and as tolerance of the crop plants.

In this test the control of *echinochloa* was between 93 and 98%, and the control of *solanum* was between 91 and 93% in three repetitions, while the damage of the maize plants was always below 10%.

20

### EXAMPLE 4

Small field units in a maize field, infested with *echinochloa crus galli*, *solanum nigrum* and *chenopodium album* are sprayed with a tank-mix suspension of dimethenamid, sulcotrione and atrazine. The stage of the weeds is "full tillering" for *echinochloa* and "6-8  
25        leaves stage" for *solanum* and *chenopodium*. The lot size is 8 meters in length and 3 meters in breadth. The application rates are 1.08 kg/ha of dimethenamid, 150 or 210 g/ha of sulcotrione and 750 g/ha of atrazine. 14 days after treatment the efficacy is evaluated. The results (in percentage control) were as follows:

Compound a.i./ha	Echinochloa control	expected additive effect	synergistic effect
Atrazine 1500	23	-	
Dimethenamid/Atrazine 1080/750	30	-	
Sulcotrione/Atrazine 150/750	26	-	
Sulcotrione/Atrazine 210/750	33	-	
Dimethenamid/Sulcotrione/Atrazine 1080/150/750	95	56	+ 39
Dimethenamid/Sulcotrione/Atrazine 1080/210/750	97	59	+ 42
	Solanum/ Chenopodium		
Atrazine 1500	16	-	
Dimethenamid/Atrazine 1080/750	36	-	
Sulcotrione/Atrazine 150/750	23	-	
Sulcotrione/Atrazine 210/750	53	-	
Dimethenamid/Sulcotrione/Atrazine 1080/150/750	97	53	+ 44
Dimethenamid/Sulcotrione/Atrazine 1080/210/750	100	89	+ 11

The synergistic effect is clearly visible at the lower rates of sulcotrione, resulting in a nearly doubled degree of control, compared to the expected additive efficacies. For the higher rates of sulcotrione, (> 300 g/ha) only the additive effect remains visible since the total control is 100%.

5

### EXAMPLE 5

10 A field trial is carried out on plots (2 x 20 m) planted with sugar cane and infested with cyperus rotundus in the first or second growing stage and sprayed with a backpack sprayer in different concentrations in a tank mix. The amount of liquid spray broth is 400 l/ha. The application rates are 2.7 kg/ha of dimethenamid with 60 g/ha of chlorimuron or with 1.6 kg/ha of a fixed ratio mixture of chlorimuron and diuron (1 : 19) which is commercially available as FRONT®. Visual evaluation is done 30 or 60 days after treatment (DAT) in percentage of control. The expected additive effect value is calculated according to the method of Colby:

15

20

25

Compound a.i./ha conditions	Cyperus Control (DAT)	expected additive effect	synergistic effect
<u>light to medium soil</u>			
Dimethenamid 2.7 kg	19 (60 DAT)	-	
Chlorimuron/Diuron 1.6kg	45 (60 DAT)	-	
Dimethenamid/Chlorimuron/Diuron 2.7 + 1.6 kg	76 (60 DAT)	55	+ 21

<p><u>heavy soil</u></p> <p>Dimethenamid 2.7 kg</p> <p>Chlorimuron/Diuron 1.6 kg</p> <p>Dimethenamid/Chlorimuron/Diuron 2.7 + 1.6 kg</p>	<p>10 (60 DAT)</p> <p>37 (60 DAT)</p> <p>74 (60 DAT)</p>	<p>-</p> <p>-</p> <p>43</p>	<p></p> <p></p> <p>+ 31</p>
<p><u>light to medium soil</u></p> <p>Dimethenamid 2.25 kg</p> <p>Chlorimuron/Diuron 1.2 kg</p> <p>Dimethenamid/Chlorimuron/Diuron 2.25 + 1.2 kg</p>	<p>23 (30 DAT)</p> <p>48 (30 DAT)</p> <p>80 (30 DAT)</p>	<p>-</p> <p>-</p> <p>60</p>	<p></p> <p></p> <p>+ 20</p>
<p><u>light to medium soil</u></p> <p>Dimethenamid 2.7 kg</p> <p>Chlorimuron/Diuron 1.2 kg</p> <p>Dimethenamid/Chlorimuron/Diuron 2.7 + 1.2 kg</p>	<p>27 (30 DAT)</p> <p>48 (30 DAT)</p> <p>88 (30 DAT)</p>	<p>-</p> <p>-</p> <p>62</p>	<p></p> <p></p> <p>+ 26</p>
<p><u>light to medium soil</u></p> <p>Dimethenamid 2.7 kg</p> <p>Chlorimuron 0.06 kg</p> <p>Dimethenamid/Chlorimuron 2.7 + 0.06 kg</p>	<p>27 (30 DAT)</p> <p>58 (30 DAT)</p> <p>93 (30 DAT)</p>	<p>-</p> <p>-</p> <p>69</p>	<p></p> <p></p> <p>+ 24</p>

The achieved results indicate that synergistic effects are obtained with the 2-way mix (dimethenamid/chlorimuron), as well as with the 3-way mix (dimethenamid/chlorimuron/diuron).

## 5 EXAMPLE 6

In the procedure as set out in Example 5, tank mixtures of 5.7 kg/ha of alachlor or 4.3 kg/ha of metolachlor with 1.2 kg/ha of the fixed ratio mixture of chlorimuron and diuron (1 : 19; commercial FRONT®) where applied to a sugar cane field. The results were as follows:

Compound a.i./ha conditions	Cyperus Control (DAT)	expected additive effect	synergistic effect
<u>light to medium soil</u>			
Alachlor 5.4 kg	30 (30DAT)	-	
Chlorimuron/Diuron 1.2 kg	48 (30DAT)	-	
Alachlor/Chlorimuron/ Diuron 5.4 + 1.2 kg	85 (30DAT)	64	+ 21
<u>light to medium soil</u>			
Metolachlor 4.3 kg	23 (30DAT)	-	
Chlorimuron/Diuron 1.2 kg	48 (30DAT)	-	
Metolachlor/Chlorimuron / Diuron 4.3 + 1.2 kg	89 (30 DAT)	60	+ 29

The achieved results indicate that synergistic effects are obtained with the tested 3-way mixtures.

WHAT IS CLAIMED IS

1. A method of controlling undesired plant growth which comprises co-application to the locus of said undesired plants growth dimethenamid and at least one other herbicide in a herbicidally effective aggregate amount.

2. A method according to claim 1, wherein the other herbicide is selected from the group comprising auxin transport inhibitors, growth regulator herbicides, photosynthesis inhibitors, pigment inhibitors, growth inhibitors, amino acid synthesis inhibitors, lipid biosynthesis inhibitors, cell wall biosynthesis inhibitors, rapid cell membrane disruptors, carbamates, nitriles, hydantocidines, triketones and diones.

3. A method according to claim 2, wherein the other herbicide is selected from the group comprising the sulfonylureas and the triketones and diones.

4. A method according to claim 3, wherein the other herbicide is a sulfonylurea herbicide selected from rimsulfuron, metsulfuron, metsulfuron-methyl, nicosulfuron, triasulfuron, primisulfuron, bensulfuron, chlorimuron, chlorimuron-ethyl, chlorsulfuron, sulfometuron, thifensulfuron, tribenuron, ethametsulfuron, clopyrasulfuron, pyrazasulfuron, prosulfuron and halosulfuron.

5. A method according to claim 3, wherein the other herbicide is a triketone herbicide selected from the group comprising 2-(2-chloro-4-methanesulfonylbenzoyl)-1,3-cyclohexanedione; 2-(4-methylsulfonyloxy-2-nitrobenzoyl)-4,4,6,6-tetramethyl-1,3-cyclohexanedione; 3-(4-methylsulfonyloxy-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 3-(4-methylsulfonyl-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(4-chloro-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H, 6H)dione; 4-(4-methylthio-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H, 6H)-dione; 3-(4-methylthio-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; (2-nitro-4-trifluoromethoxybenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-

3,5-(4H, 6H)-dione.

6. A method according to claim 2 wherein the other herbicide is selected from one or more of dicamba, nicosulfuron, rimsulfuron, imazethapyr, glyphosate, glufosinate, sethoxydim, fluazifop, sulcotrione, chlorimuron and diuron.

7. A method according to claim 1, wherein the amount of dimethenamid is from 0.1 to 3.0 kg/ha, preferably 0.25 to 1.5 kg/ha.

8. A method according to claim 4, wherein the amount of the sulfonylurea is from 1 to 150 g/ha, preferably 10 to 100 g/ha.

9. A method according to claim 5, wherein the amount of triketone is from 0.05 to 2 kg/ha, preferably 0.1 to 0.6 kg/ha.

10. A herbicidal composition comprising a herbicidally effective aggregate amount of dimethenamid and at least one other herbicide, and an agriculturally acceptable carrier.

11. A composition according to claim 10, characterized in that it contains dimethenamid and at least one other herbicide in a quantity producing a synergistic herbicidal effect.

12. A composition according to claim 10, wherein the other herbicide is selected from the group comprising rimsulfuron, metsulfuron, metsulfuron-methyl, nicosulfuron, triasulfuron, primisulfuron, bensulfuron, chlorimuron, chlorimuron-ethyl, chlorsulfuron, sulfometuron, thifensulfuron, tribenuron, ethametsulfuron, clopyrasulfuron, pyrazasulfuron, prosulfuron, halosulfuron, 2-(2-chloro-4-methanesulfonylbenzoyl)-1,3-cyclohexane dione; 2-(4-methylsulfonyloxy-2-nitrobenzoyl)-4,4,6,6-tetramethyl-1,3-cyclohexanedione; 3-(4-

methysulfonyloxy-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 3-(4-methylsulfonyl-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(4-chloro-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H, 6H)dione; 4-(4-methylthio-2-nitrobenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5(4H,6H)-dione; 3-(4-methylthio-2-nitrobenzoyl)-bicyclo[3,2,1]octane-2,4-dione; 4-(2-nitro-4-trifluoromethoxybenzoyl)-2,6,6-trimethyl-2H-1,2-oxazine-3,5-(4H, 6H)-dione.

13. A composition according to claim 10 wherein the active component is selected from one or more of dicamba, nicosulfuron, rimsulfuron, imazethapyr, glyphosate, glufosinate, sethoxydim, fluazifop, sulcotrione, chlorimuron and diuron.

14. A method for combatting grassy weeds in sugar cane which comprises co-application to the locus of said weeds a chloroacetamide herbicide and at least one sulfonylurea herbicide in a herbicidally effective aggregate amount.

15. A method according to claim 14, comprising additionally co-application of an urea herbicide in a herbicidally effective aggregate amount.

16. A synergistic herbicidal composition for the control of grassy weeds in sugar cane comprising a herbicidally effective amount of a chloroacetamide herbicide an at least one sulfonylurea herbicide, and an agriculturally acceptable carrier.



5

ABSTRACT OF THE DISCLOSURE

HERBICIDE COMPOSITIONS

10 Co-application of dimethenamid with other herbicides provides improved  
herbicidal activity.

15

20

25